

June 10, 2016

United States District Court for the District of Arizona

Feldman, et al. v. Arizona Secretary of State's Office, et al.

Case No. 16-1065-PHX-DLR

Expert Report of Jonathan Rodden, PhD

**737 Mayfield Avenue
Stanford, CA 94305**

A handwritten signature in black ink, appearing to read 'Jonathan Rodden', is positioned above a horizontal line.

Jonathan Rodden, PhD

I. SUMMARY

I have been engaged by counsel for the Plaintiffs in the above-referenced case, who have asked me to examine the impact of the allocation of polling locations in the 2016 presidential preference election (“PPE”) in Maricopa County. I have also been asked to evaluate Arizona’s policy of not counting ballots that are cast in a precinct other than the one to which the voter was assigned (“out-of-precinct provisional ballots” or “out-of-precinct voting”), and to assemble information about the race, age, place of residence, and partisanship of those whose ballots are not counted due to out-of-precinct voting. Finally, I have been asked to examine possible explanations for Arizona’s unusually high rates of uncounted provisional ballots in recent elections, paying special attention to changes in polling locations and other aspects of election administration, and to explore implications of recent confusion about polling locations in the 2016 PPE for future general elections.

In this report, I demonstrate that Arizona is the leader among U.S. states in uncounted provisional ballots because of problems with election administration related to the locations of precincts and polling locations and the rules for counting ballots. Voters must invest significant effort in order to negotiate a dizzying array of precinct and polling place schemes that change from one month to the next. Further, Arizona’s population is highly mobile and residential locations are fluid, especially for minorities, young people, and poor voters, which further contributes to confusion around voting locations. By frequently moving and consolidating polling locations and sometimes shifting to temporary “vote centers,” Arizona’s election

administration, especially in Maricopa County, has imposed significant costs on those desiring to participate on Election Day. Specific findings can be summarized as follows:

- 22 percent of voters visiting a polling place in Arizona in the 2012 general election were asked to cast a provisional ballot, and over 33,000 of these—more than 5 percent of all in-person ballots cast—were rejected. The provisional voting rate was 18 percent in 2014. No other state rejects a larger share of its in-person ballots.
- Arizona rejected 11,000 ballots that it classified as out-of-precinct in 2012, and 3,500 in 2014. No other state comes close to this rate of rejected out-of-precinct ballots.
- Rejected out-of-precinct provisional ballots are most prevalent in the relatively urban counties, especially Maricopa and Pima.
- In Maricopa County, many of the ballots that were classified by the election administration as “out-of-precinct” were cast by voters who were registered in and had official addresses in the precinct where they tried to vote. These voters were evidently falsely disenfranchised. In 2008, the number of such voters was 2,309, and in 2012 it was 2,645. As a share of in-person voters, the numbers are similar in the mid-term years of 2010 and 2014.
- The rate at which in-person ballots are discarded under these circumstances (i.e., “misclassified out of precinct”) is 80 percent higher for Hispanics, 34 percent higher for African Americans, and 26 percent higher for Native Americans than for whites.
- However, if we focus only on the “true” out-of-precinct votes (i.e., those instances where voters were not falsely disenfranchised), the rate is 131 percent higher for Hispanics, 74 percent higher for African Americans, and 39 percent higher for Native Americans than whites.
- Out-of-precinct votes are substantially more likely to be cast by young people. They are also more likely to be cast by people who live in

neighborhoods characterized by large numbers of renters and individuals who frequently change addresses.

- The rate of out-of-precinct voting was 65 percent higher for Democrats than Republicans in Maricopa County, and 56 percent higher in Pima County.
- Most out-of-precinct votes in Maricopa County are cast very close to the assigned polling place. One quarter of out-of-precinct voters cast ballots in polling places that are actually closer to their home than their assigned polling place.
- Many polling places are located directly on precinct boundaries, and multiple polling places are often clustered together, sometimes even in the same building. Voters living further from their polling place, and voters living in close proximity to multiple polling places, are more likely to cast invalid ballots.
- Hispanics and Native Americans are more likely to live further from their assigned polling places, and Hispanics are more likely to live in proximity to multiple proximate polling places to which they are not assigned.
- Residents of Phoenix are more likely to cast out-of-precinct ballots than residents of other cities in Maricopa County.
- Changes in polling place locations are associated with higher rates of out-of-precinct voting. African Americans and Hispanics are substantially more affected by this than whites. In particular, the impact of precinct consolidation, while statistically significant for all groups, is more than twice as large for Hispanics and African Americans as for non-Hispanic whites.
- The number and locations of polling places in the 2016 presidential preference election created a large “shock” to the cost of voting for everyone in Maricopa County, but the costs were larger for African Americans and Hispanics.

All of these facts indicate that the recent difficulties with the temporary move to voting centers in Maricopa County during the 2016 PPE and May 17 Special

Election will only reinforce and likely magnify the persistent misunderstandings that lead to unusually high rates of uncounted in-person votes in Maricopa County specifically and Arizona generally. Further, the sudden move from 724 assigned polling places to 60 “vote centers” is in keeping with the broader historical trends in Arizona election administration: it imposes significant costs on voters, and as with the other aspects of election administration covered in the report, these costs fall disproportionately on minorities.

II. QUALIFICATIONS

I am currently a tenured Professor of Political Science at Stanford University and the founder and director of the Stanford Spatial Social Science Lab—a center for research and teaching with a focus on the analysis of geo-spatial data in the social sciences. Students and faculty members affiliated with the Lab are engaged in a variety of research projects involving large, fine-grained geo-spatial data sets including individual records of registered voters, Census data, survey responses, and election results at the level of polling places. Prior to my employment at Stanford, I was the Ford Professor of Political Science at the Massachusetts Institute of Technology. I received my Ph.D. from Yale University and my B.A. from the University of Michigan, Ann Arbor, both in political science. A copy of my current C.V. is included as Appendix B.

In my current academic work, I conduct research on the relationship between the geographic location of demographic and partisan groups, the drawing of electoral districts, and patterns of political representation. I have published papers on political geography and representation in a variety of academic journals

including *Proceedings of the National Academy of Science*, *American Economic Review Papers and Proceedings*, the *Journal of Economic Perspectives*, the *Virginia Law Review*, the *American Journal of Political Science*, the *British Journal of Political Science*, the *Annual Review of Political Science*, and the *Journal of Politics*. One of these papers was recently selected by the American Political Science Association as the winner of the Michael Wallerstein Award for the “best paper on political economy” published in the last year. I have recently written a series of papers, along with my co-author, Jowei Chen, using automated redistricting algorithms to assess partisan gerrymandering. This work has been published in the *Quarterly Journal of Political Science* and *Election Law Journal*, and featured in more popular publications like the *Wall Street Journal*, the *New York Times*, and *Boston Review*. I am currently writing a book on the relationship between political districts, the residential geography of social groups, and their political representation in the United States and other countries that use winner-take-all electoral districts.

I have expertise in the use of large data sets and geographic information systems (GIS) to analyze aspects of political representation. I have developed a national data set of geo-coded precinct-level election results that has been used extensively in policy-oriented research related to redistricting and representation.¹ I have worked extensively with Census data from the United States and other countries.

I have been accepted as and testified as an expert witness in four recent election law cases. First, I have testified in two cases related to redistricting: *Romo v.*

¹ The dataset can be downloaded at <http://projects.iq.harvard.edu/eda/home>. The data can be visualized in an interactive web map, available at <http://atlas.esri.com/Atlas/VoterAtlas.html>.

Detzner (2012-CA-000412 in Florida Circuit Court, Leon County), and *League of Women Voters of Florida, et al. v. Detzner, et al.* (2012-CA-002842 in Florida Circuit Court, Leon County). More recently, I have offered expert testimony in a case related to Section 2 of the Voting Rights Act: *Missouri State Conference of the National Association for the Advancement of Colored People, et al. v. Ferguson-Florissant School District and St. Louis County Board of Election Commissioners* (Civ. No. 14-2077) in the United States District Court for the Eastern District of Missouri. Finally, I testified in *Barbara H. Lee, et al. v. Virginia State Board of Elections, et al.* (Case No. 3:15-CV-357) in the United States District Court for the Eastern District of Virginia. I am being compensated at the rate of \$500/hour for my work in this case.²

III. PRECINCTS AND THE COSTS OF VOTING IN ARIZONA

For busy citizens with jobs, community responsibilities, and children and parents to care for, voting in primaries, general elections, and local elections has a cost. Given the low probability that any one individual's vote will affect the outcome of an election or the direction of public policy, rational individuals often make the calculation that the subtle costs of voting—updating one's registration after moving to a new apartment, obtaining information about the correct polling place, arranging transportation on Election Day—are higher than the benefits of voting, even among individuals who are motivated by an interest in public policy, the desire to be seen

² I was assisted in my analyses by Bradley Spahn, who is a Ph.D. student in the political science department at Stanford, and by Nicholas Eubank, who is a Ph.D. student in the Graduate School of Business at Stanford. Both were compensated by Plaintiffs' counsel at a rate of \$200/hour and \$140/hour, respectively, for their work. I reviewed and approved of all of their work. In my work as a political scientist, I typically rely upon the work of students like Mr. Spahn and Mr. Eubank to assist me with the type of analyses presented in this report in the same manner.

by themselves or others as good citizens, or by intrinsic motivations like patriotism, duty, and civic pride.

This so-called “calculus of voting” has been the focus of political science research since the classic work of Anthony Downs.³ A central conclusion is that when the costs exceed the benefits many citizens will abstain from voting. Like dieting or quitting smoking, many voters report the desire and intention to vote, but actual turnout falls short of these reported intentions. Political scientists have discovered that even seemingly small changes to the costs of voting can make a substantial difference in turnout. A generation of research on behavioral economics suggests that very small changes in incentives, like the placement of healthy foods in a cafeteria or the choice architecture for retirement plans, can have surprisingly large effects on behavior.⁴ Likewise, political science research shows that very consequential changes in the cost of voting are often induced by seemingly mundane decisions of election administrators.⁵ Above all, recent research has demonstrated that changes in polling locations associated with precinct consolidations have a substantial effect on turnout.⁶ Voting is a habit and custom, and the more routinized the process, the less costly it is for voters. A sudden unanticipated change in polling location introduces a shock to the cost of voting,

³ Anthony Downs, 1957, “An Economic Theory of Political Action in a Democracy,” *Journal of Political Economy* 65(2): 135-150. See also William Riker and Peter Ordeshook, 1968, “A Theory of the Calculus of Voting,” *American Political Science Review* 62(1): 25-42.

⁴ See, for instance, Richard Thaler and Cass Sunstein, 2008, *Nudge: Improving Decisions about Health, Wealth, and Happiness*. Yale University Press.

⁵ See, for instance, Barry Burden and Jacob Neiheisel, 2013, “Election Administration and the Pure Effect of Registration on Turnout,” *Political Research Quarterly* 66(1): 77-90.

⁶ John McNulty, Conor Dowling, and Margaret Ariotti, 2009, “Driving Saints to Sin: How Increasing the Difficulty of Voting Dissuades Even the Most Motivated Voters,” *Political Analysis* 17(4): 435-455; Henry Brady and John McNulty, 2011, “Turning out to Vote: The Costs of Finding and Getting to a Polling Place,” *American Political Science Review* 105(1): 115-134.

especially for voters with lower levels of information.⁷ These costs include not only the travel cost of getting to the polling place, but more importantly, the “search costs” associated with obtaining information about the new polling place and locating it.⁸

Another important lesson from the academic literature is that the benefits of voting are not uniform across individuals in a community. For some people, an important part of the benefit of voting is experiential: some voters derive meaning from the experience of community membership and participation in civic life associated with in-person voting on Election Day. Thus some Arizona voters choose not to register for the Permanent Early Voting list, and a large number of those receiving ballots in the mail choose not to mail them and instead show up at the polling place on Election Day to cast their vote.

Likewise the costs of voting also vary a great deal across individuals. Above all, the cost of voting in the United States can be substantially higher for low-income and young renters who frequently move from one apartment to another, requiring frequent interaction with election administrators to update their registration. An unanticipated change in polling place or unanticipated long lines on Election Day could have an especially large impact on the working poor, who typically have very little flexibility in their work day, and must vote during a narrow window in the morning or evening. In metropolitan areas like Maricopa and Pima Counties, census data reveals that minorities are far more likely than whites to find themselves in this category.

⁷ Brady and McNulty (2011), *op cit.*

⁸ Brady and McNulty (2011), *op cit.*, McNulty, Dowling, and Ariotti (2009) *op cit.*

The United States is one of the most politically and fiscally decentralized countries in the world, which adds considerable complexity to the task of election administration that often translates into higher costs for voters. Because lower-level governments administer federal elections, and county-level administrators—especially in urbanized areas—must contend with an array of overlapping city council districts, water districts, justice of the peace districts, school districts, state legislative districts, and Congressional districts, precincts must be created, and ballots printed, so that the residential address of every voter is connected to the right bouquet of local elected offices. This has led to the creation of precincts or voting tabulation districts—small, geographically compact groups of households with the same bouquet of local jurisdictions—and these are often associated with a single polling location.

Arizona law further complicates this process by permitting each county to choose, in each election, whether to run the election in their district under a “vote center” model, where every voter in the county can vote at any polling location in the county in which they reside, or a precinct-based model, under which each voter is assigned to a particular precinct. Some counties, like Maricopa, switch back and forth between a vote center model and a precinct-based model from one election to another throughout the year. For elections in which a precinct-based system is used, the Arizona Secretary of State’s Office has interpreted Arizona law to require the rejection of the entirety of any ballots cast in a precinct other than the one to which the voter was assigned, even if a “vote center” model was in effect only a few months earlier. Such ballots are often referred to as “out-of-precinct” ballots and, as

discussed further in this report, a substantial number of otherwise eligible Arizona voters are disenfranchised in each election as a result of this policy.

The policy of rejecting out-of-precinct provisional ballots wholesale generates a cost for voters—one that falls disproportionately on those who are more likely to be renters with frequent address changes: in particular Hispanic voters, African-American voters, and young voters. An individual who faces a rent increase in one apartment complex and moves to another less than a mile away might not be aware that she has moved into an entirely new precinct--indeed, in many cases (as discussed further in this report) she may still live closest to her old precinct, but may now be required to travel further in order to vote in her new assigned precinct. Among groups for whom residential mobility is common, requirements of in-precinct-voting—as well as the requirement that they update their registration with the state every time that they move even a short distance within a county—can make it substantially more burdensome to participate in elections. Not only must movers take the time to negotiate the procedure for changing their registration address, they must constantly reeducate themselves about whether a vote center or precinct-based system will be used for the election at hand, and in the event of the latter, the shifting location of the correct polling place.

This class of issues is especially important in Arizona. The 2006-2010 American Community Survey includes data on the length of time individuals have lived in the home or apartment in which they resided during the data collection period. According to these data, almost 70 percent of Arizonans have changed their

residential address in the decade from 2000 to 2010.⁹ On this indicator of residential instability, Arizona is second only to Nevada. The same survey also asks respondents to report whether they have moved in the last year: 21 percent of Arizonans reported doing so. On this metric the only states edging out Arizona were North Dakota, Alaska, and Nevada.

The vast majority of those in Arizona who reported moving in the last year were actually moving within their current city of residence. On this metric—within-city moves in the last year—Arizona is again second only to Nevada. And the vast majority of these within-city moves took place in Maricopa and Pima counties.¹⁰

In addition to the movement of voters across precinct boundaries, a further difficulty with precinct-based voting is the movement of polling places from one election to another. This can lead to higher voting costs, and hence lower turnout, not only for those with unstable residential histories, but even for engaged, habitual voters residing for a long period of time at one address.¹¹

Polling places in some of Arizona's most populous counties change with great frequency. For instance, Maricopa instituted a major precinct consolidation right before the 2012 general election. There were 1143 polling places for the general mid-term election in November 2010, 211 for presidential preference primary in February of 2012, and then 724 later that year for the general presidential election.¹²

⁹ American Community Survey, 2006-2010 Five-Year Estimates. Accessed via the National Historical GIS (nhgis.org).

¹⁰ ACS 2006-2010 Five-Year Estimates, op cit.

¹¹ McNulty, Dowling, and Ariotti (2009), op cit.

¹² <http://recorder.maricopa.gov/pollingplace/pastpollingplacedetail.aspx>

Moreover, for the general elections of 2008, 2012, and 2016 in Maricopa County, a completely different precinct system was used for the presidential preference primary than for the general election. In order to save money, as authorized by state law, the Maricopa County election administration used fewer polling places in presidential preference primaries occurring in the spring than in the general election occurring a few months later. The reasoning for the smaller number seems to be driven by the increasing number of Arizonans making use of early voting, the observation that turnout is sometimes sparse in non-competitive years like 2012, and above all, the fact that the number of voters eligible to vote in the primary is much smaller than the number eligible to vote in the general election because many registered voters have not designated a party affiliation.

This money-saving practice imposes considerable costs on voters, however. In 2008 and 2012, most in-person voters in Maricopa County were required to obtain information about a different assigned polling place than the one they may have used in other recent elections. In 2008, the usual 1142 polling places were consolidated to 403, and in 2012, the number was reduced all the way 211.¹³

These efforts at reducing election administration costs unfortunately imposed new search and travel costs on voters that wished to participate in the primary. These temporary precinct consolidations also generated confusion about the correct polling place in November, thereby suppressing turnout and contributing to the problem of out-of-precinct provisional ballots. In particular, there was a spike in the number of out-of-precinct provisional ballots cast in 2012,

¹³ <http://recorder.maricopa.gov/pollingplace/pastpollingplacedetail.aspx>

which corresponds to the major change in precincts discussed above as well as the substantial change in polling locations between the 2012 PPE and 2012 general election. Of course there is no reason why votes in statewide, countywide, or presidential contests must be cast in a specific precinct in order to be counted. The only reason for rejecting out-of-precinct ballots is the presence of local districted contests that are printed on the same ballot. Recognizing this, Maricopa County followed the lead of counties like Yuma and Yavapai Counties and did away with the requirement of in-precinct voting in the March 2016 PPE, and instead set up 60 “vote centers” at which any registered party affiliate could vote regardless of residential location. This vote center model assuaged, at least for one day, Maricopa’s persistent problem of out-of-precinct provisional ballots. However, due to some serious miscalculations about voter turnout, as detailed below, it clearly increased the costs of voting for many residents of Maricopa County, many of whom had to wait in unconscionably long lines in order to cast their ballots. Moreover, since vote centers will *not* be used in November 2016 and many future general elections, this high-profile incident introduced considerable additional confusion into the already-muddy topic of where in-person voters should go on Election Day.

The 2016 PPE also aptly illustrates why the issue of voter confusion is further complicated in Arizona. As noted above, localities may switch between vote center and precinct-based elections from election to election, sometimes (as with Maricopa County in 2016) even within the same year.¹⁴ In such jurisdictions, voters are faced with added difficulties in accurately identifying their appropriate polling

¹⁴ A.R.S. § 16:411.

place. Not only are different locations usually used for vote centers as opposed to precincts, the voter must become educated about the type of election that is being administered in each separate elections cycle, and learn that while under a vote center based model she can vote anywhere in the county, in a precinct-based model, she must identify and cast her ballot at only one location.

Localities like Maricopa County, which houses the city of Phoenix, add an even more confusing complication--there, Phoenix City elections are held under vote center models at entirely different locations than the Maricopa Elections. And, in the 2016 general election, both Maricopa County and the City of Phoenix will be holding some elections at different locations within Maricopa County on the same day. Additional confusion results in Maricopa as well because on May 17, 2016—only two months after the disastrous vote center interlude—Maricopa used another completely different system of precincts and polling places featuring 122 assigned polling places rather than the 724 that it plans to use in August and November 2016.

Throughout the year, Arizona's voters are receiving an array of sample ballots and new instructions about polling locations for a variety of local, state, special district, and federal elections. In Maricopa County, new information arrives for elections held in (at least) March, May, August, and November. The information often arrives only weeks before Election Day. It is not surprising that busy and information-constrained voters, for whom politics and elections are not central activities in life, might be unable to make the necessary investment to wade through it all, choosing to abstain, or trying and failing to vote at the correct polling place.

One way around this problem in Arizona might be to sign up for the permanent early voting list.¹⁵ As Table 1 shows, a growing number of registered voters are doing so. Since 2012, absentee ballots were sent to a little over half of registered voters in Arizona. However, as the number of ballots mailed out has been increasing, the share of those ballots actually returned has been steeply decreasing. Comparing presidential elections, the share of ballots returned has fallen from 94 percent in 2008 to 80 percent in 2012. For mid-term elections the rate at which absentee ballots are returned has fallen from 77 percent in 2010 to 58 percent in 2014.

While many of those who do not submit their ballot are making a choice to abstain, a large number are also showing up to the polling place on Election Day, where they are asked to submit provisional ballots.¹⁶ It appears that some voters view the early ballot as an absentee option to be used in the event that they will not be able to make it to a polling place on Election Day. It may also be the case that some voters have grown mistrustful of the early voting process, given that the ballot can be rejected for reasons like improper or non-matching signature. The data in Table 1 indicate that the rate at which submitted absentee ballots are rejected has been growing over time, reaching almost 1 percent by 2014. Some voters also worry

¹⁵ Because voting by absentee entails its own costs, it is not always a perfect alternative or substitute for voters who are unable to cast their vote in person. In particular, there are significant information costs associated with absentee voting and, often, require voters to also navigate a sometimes-confusing web of deadlines. Further, in Arizona, a ballot must arrive at the Recorder's office by the close of the election. Thus, voters waiting until later in the election cycle to make their voting determinations may have no choice but to cast their vote in person. Additionally, it is my understanding that a number of voters in Arizona may not have outgoing mail options which further complicates the early voting process. *See* discussion in text regarding additional problems with early voting.

¹⁶ For instance, the vote history indicators in an early 2013 Maricopa voter file that was produced by the Democratic National Committee, indicate that of those who showed up in person to vote in the 2012 presidential election, almost one quarter were on the permanent early voting list.

about whether their mail-in ballot will actually be counted, especially those mailed as Election Day approaches, since media reports have indicated that such ballots are the last to be counted.

Table 1: Absentee Voting in Arizona

Year	2008	2010	2012	2014
Registered voters	3,441,141	3,502,743	3,725,362	3,802,786
Ballots sent out	1,308,030	1,410,083	1,920,746	2,060,603
Ballots submitted	1,223,936	1,084,665	1,542,855	1,193,537
Ballots counted	1,217,109	1,076,402	1,530,465	1,182,149
Ballots rejected	6,827	8,263	12,390	10,388
Missed deadline	1,611	2,944	4,107	3,312
No voter signature	3,041	3,692	5,256	4,268
Non-matching signature	1,645	1,125	2,051	1,563
Ballot returned in unofficial envelope	1	2	72	286
Ballot missing from envelope	171	52	173	56
No resident address on envelope	0	0	122	0

IV. TURNOUT AND OUT-OF-PRECINCT VOTING IN ARIZONA

In sum, much of Arizona has an extremely mobile population characterized by a high degree of residential churn, and its election administrators frequently alter the location of polling places while (usually) insisting that in-person votes can only be counted if voters successfully cast their votes in the right place. Given the costs imposed by this confluence of factors, along with other shortcomings of election administration in Arizona, it would not be surprising to see that Arizona has unusually low rates of registration and turnout among its citizens and high rates of invalid out-of-precinct provisional ballots among those registered voters who attempt to cast in-person votes. Moreover, it would not be surprising to see that

these problems are especially pronounced among minority groups that are more likely to be among the working poor and more likely to have unstable residential histories.¹⁷ To examine these possibilities, let us now turn to data on turnout and provisional ballots.

First, I demonstrate that Arizona's turnout is indeed quite low relative to other states, especially among minorities. Second, I demonstrate that Arizona's problem with uncounted provisional ballots is far worse than other states. Third, I conduct an in-depth case study of out-of-precinct voting in Maricopa County, where I have been given access to rich individual-level data, showing that out-of-precinct provisional ballots are cast far more frequently by minorities, young people, and Democrats than would be expected given their share of voters. Finally, I extend this analysis to two additional counties to provide an overall indication of the implications of this practice in the rest of the state: Pima and Coconino.

Arizona's Turnout in Comparative Perspective

If the costs of voting are especially high due to distinctive features of election administration in Arizona, we might expect to see that Arizona has unusually low rates of registration and turnout, and unusually high rates of rejected ballots. Indeed this is the case. As part of its Current Population Survey, the United States Census Bureau collects data on self-reported registration and voting after each general election, publishing estimates of registration and turnout by race and

¹⁷ According to the most recent five-year American Community Survey, the poverty rate for African Americans is more than twice that of whites, and for Native Americans it is more than three times higher. Rates of home ownership are more than twice as high for whites as blacks, and around 1.5 times higher for whites than for Hispanics and Native Americans.

ethnicity in each state. These data indicate that Arizona is one of the least successful states in registering its voters and eliciting votes in general elections.

Figure 1 draws upon the November 2012 Current Population Survey and presents turnout in the 2012 general election as a share of citizen voting-age population.¹⁸ It demonstrates that Arizona was ranked near the bottom of all states (44th) in overall turnout.

The problem of low registration and electoral participation is especially pronounced among Arizona's racial and ethnic minorities. Figure 2 displays estimates of turnout among African Americans, and Figure 3 does so for Hispanics. Estimates are unavailable in states with very small minority populations, and in each graph, observations are limited to states where the group makes up at least two percent of the citizen voting-age population.

¹⁸ I have chosen to present cross-state data from the most recent presidential election since it featured the same hotly contested presidential race in all states. Turnout in mid-term elections is difficult to compare across states since some states feature important gubernatorial and senatorial races that induce higher turnout, while other states do not. In fact, due to the advantages of incumbency and the lopsided nature of partisan competition in some regions, mid-term general elections in some states feature almost no competitive contests.

Figure 1: Turnout as share of total citizen voting-age population, 2012 general election, according to Current Population Survey November 2012

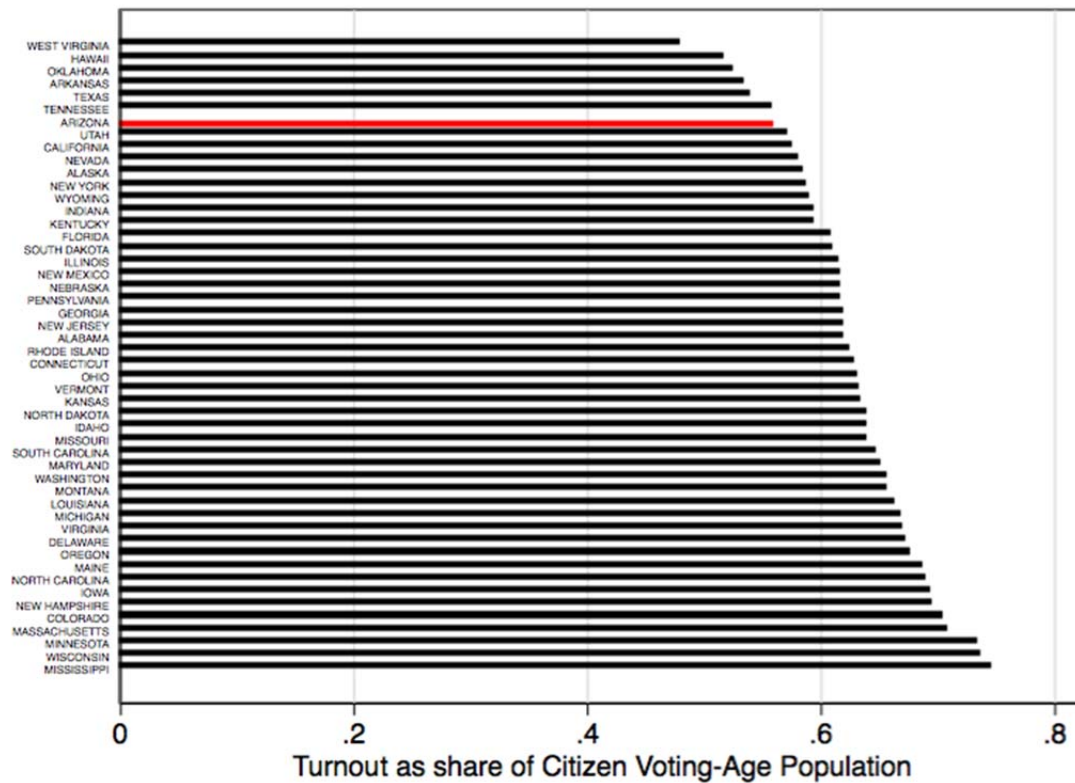


Figure 2 (below) reveals the striking fact that turnout among African Americans in Arizona was only 46 percent during a hotly contested presidential election where the same measure of African-American turnout was over 66 percent nationwide. Only Alaska had a worse showing among its (very small) African American population.

Figure 2: African-American turnout as share of total African-American citizen voting-age population, 2012 general election, according to Current Population Survey November 2012

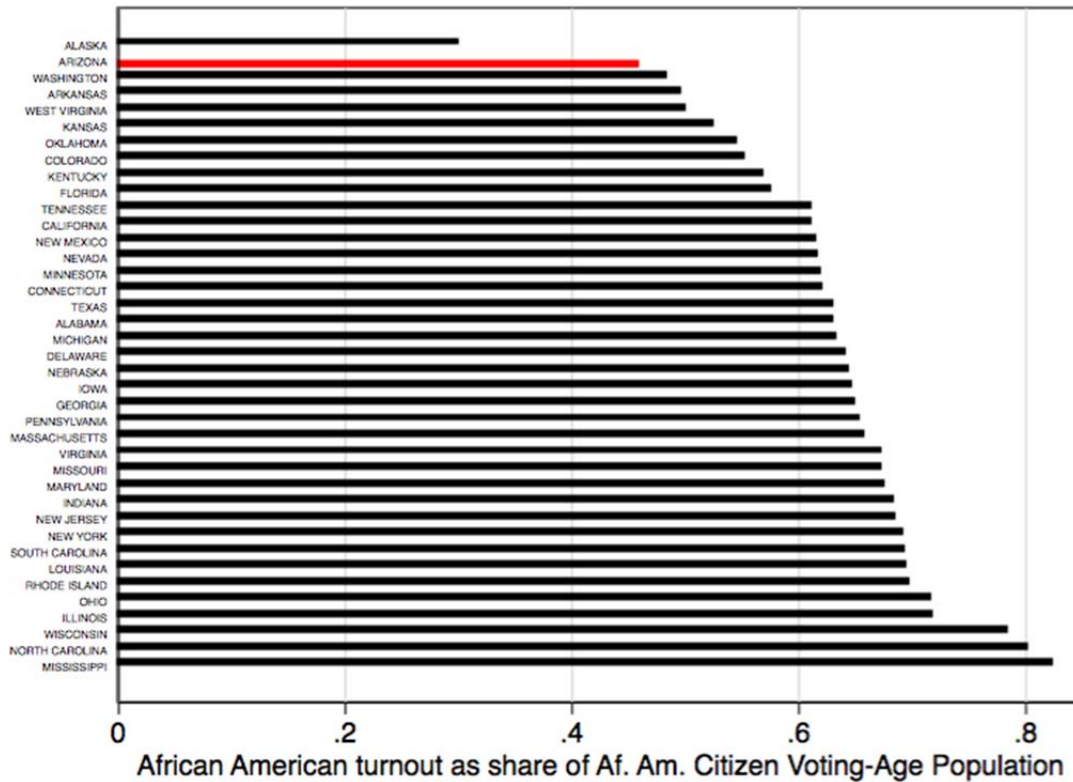
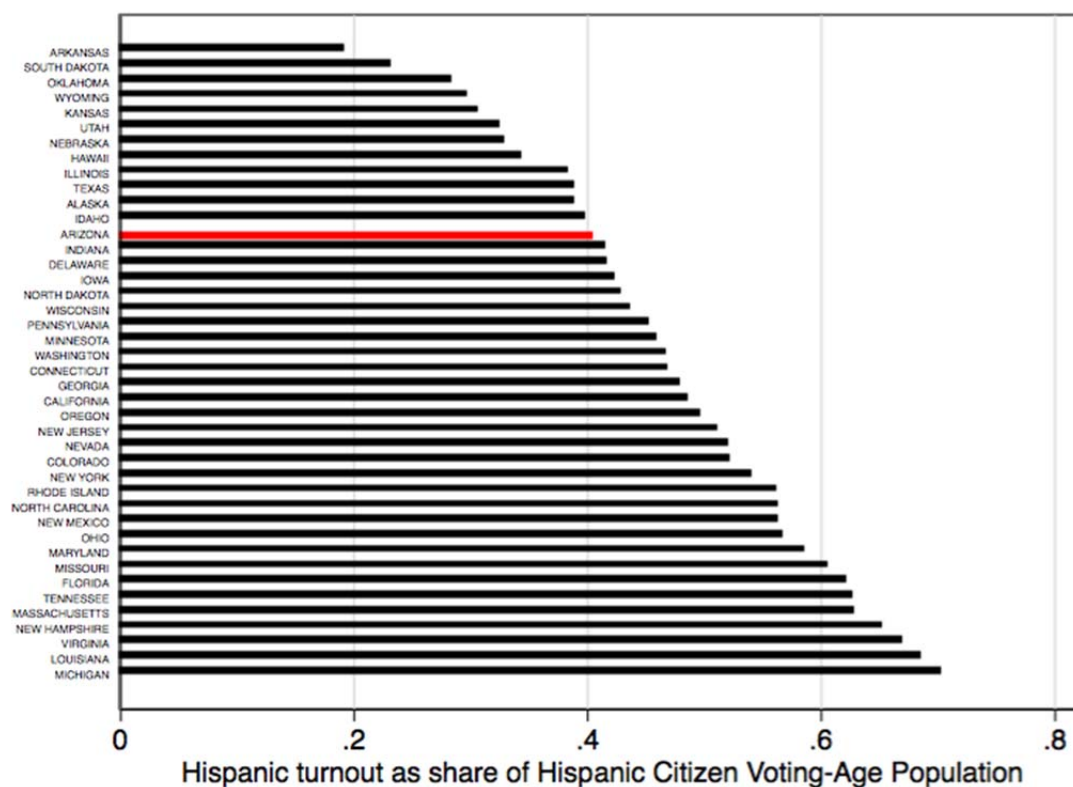


Figure 3 (below) reveals that Arizona is also among the laggards in turnout among citizen voting-age Hispanics. Its turnout rate of 39 percent is in the bottom third of all states. In contrast, the non-Hispanic white turnout rate in Arizona was 62 percent.

Figure 3: Hispanic turnout as share of total Hispanic citizen voting-age population, 2012 general election, according to Current Population Survey November 2012



Out-of-Precinct Voting: Arizona in Comparative Perspective

Before taking a closer look at the relationship between the unusual features of election administration in Arizona and the problem of out-of-precinct voting, it is useful to see the big picture of how Arizona compares with other states. Arizona is not only among the states with the lowest levels of electoral participation, but among those who do attempt to cast ballots, Arizona has the dubious distinction of being the national leader in rejecting those ballots as invalid. As with registration and turnout, this aspect of election administration has a disproportionate impact on

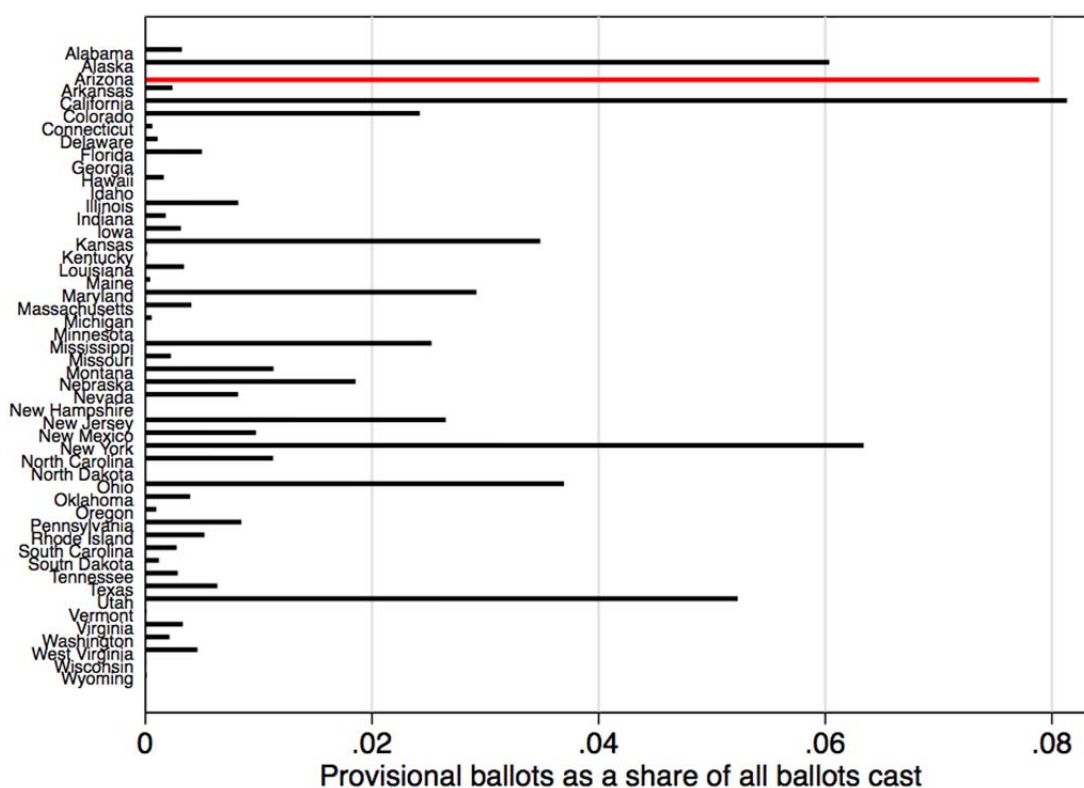
minorities. Since Arizona's problems are not new, and they are not "normal" when compared with other states, we must search for answers in Arizona's practices of election administration or characteristics of its population.

Perhaps the greatest change to the voting process in the United States, ushered in by the Help America Vote Act of 2002, was the mandate to offer provisional ballots at all polling places for instances when the eligibility of a voter is in question. While this is an invaluable failsafe to protect the franchise in light of inevitable bureaucratic snafus or other misfortunes, it has had some unintended consequences. Primarily, in a well-meaning effort to be conscientious, poll workers often ask voters to fill out provisional ballots given any question at all about eligibility. This increases the burden on the voter who has to endure the more lengthy process of casting a provisional ballot that may or may not be counted, as well as other voters at the polling place who are subjected to longer wait times in line.¹⁹

This issue has become especially difficult in Arizona, which has become one of the nation's leaders in provisional voting. Figure 4 is drawn from data presented in the *2012 Election and Voting Administration Survey*, published by the United States Election Assistance Commission (EAC) based on data collected from a survey of state election administrators. It demonstrates that as a share of all ballots cast in the 2012 general election, Arizona was second only to California in the use of provisional ballots.

¹⁹ See, e.g., Maricopa County Elections Dep't, Provisional Ballots General 2012 Presentation (Jan. 30, 2013) at 185 (noting costs of provisional balloting in terms of longer lines and losses in voter confidence).

Figure 4: Provisional ballots as a share of ballots cast in the 2012 general election according to AEC report



Since a large share of Arizona voters cast their ballots early by mail, Figure 4 underestimates the prevalence of provisional ballots cast on Election Day in Arizona. Drawing on reports published for each general election by the EAC, Figure 5 displays provisional ballots as a share of all in-person ballots cast for each general election in Arizona since 2006. It shows that provisional ballots were in the range of 9 to 13 percent of all in-person ballots cast from 2006 to 2010, and then exploded in the 2012 general election, comprising over 22 percent of all in-person ballots cast. More than one in every five voters visiting a polling place in Arizona in 2012 was asked to cast a provisional ballot, and over 33,000 of these—more than 5 percent of

all in-person ballots cast—were rejected. No other state rejected a larger share of its in-person ballots in 2012.

**Figure 5: Provisional ballots as share of in-person ballots cast in Arizona
According to EAC reports**

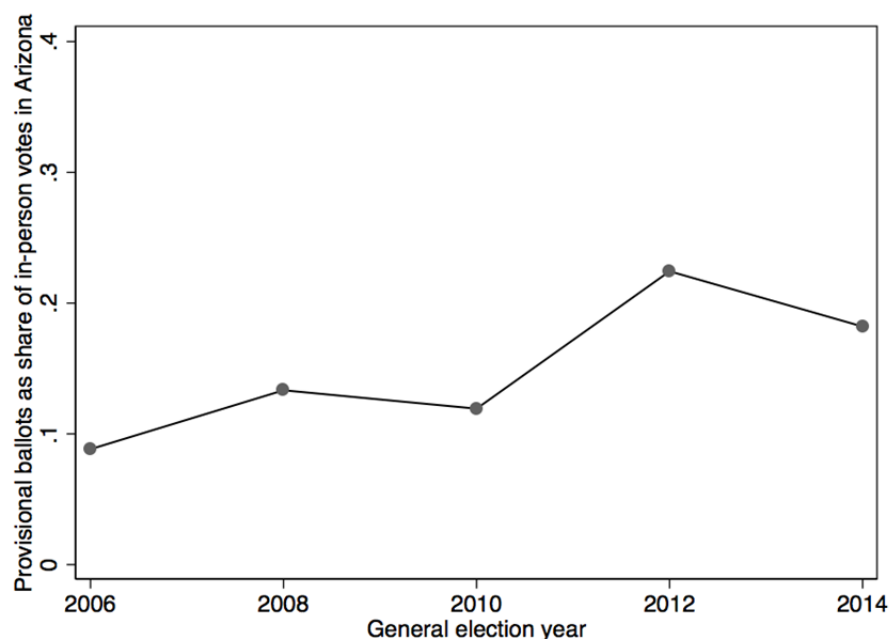
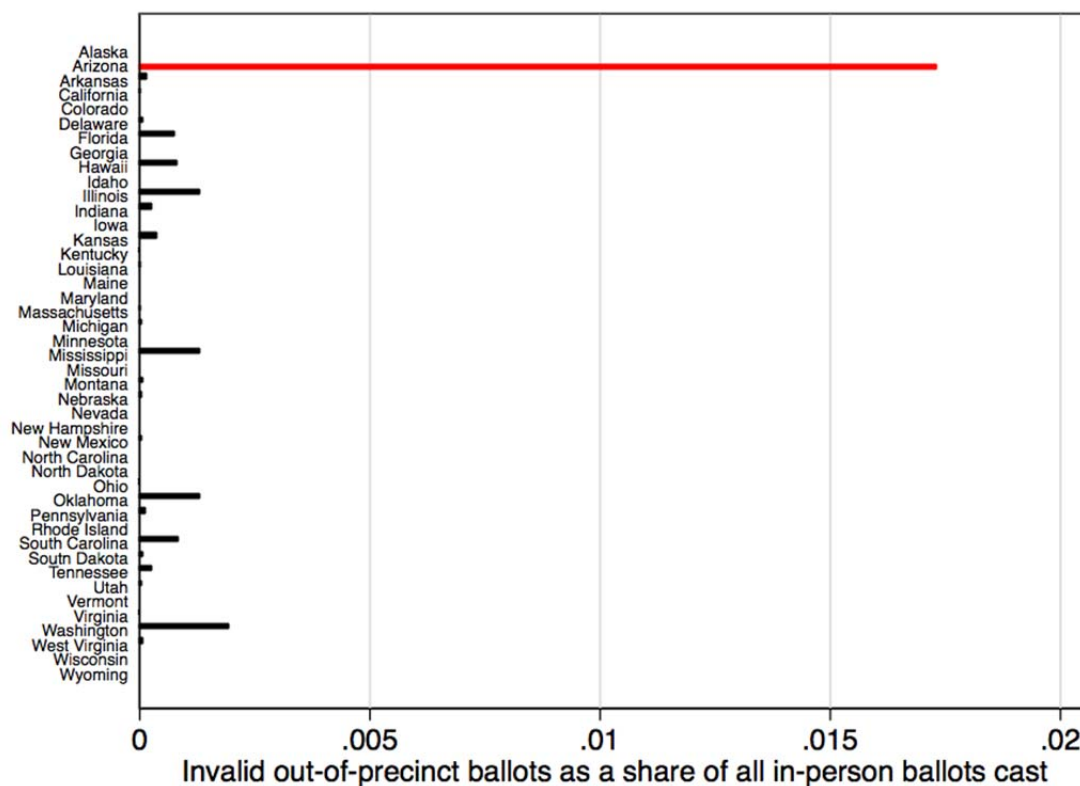


Figure 5 also shows that in spite of much lower turnout, the problem did not go away in the 2014 mid-term election. On the contrary, the rate of provisional balloting was over 18 percent—easily the highest among the 50 states. Since 2012, Arizona has clearly become the national leader in both provisional ballots cast and especially in provisional ballots rejected among in-person voters

Many of the other states with relatively large numbers of provisional ballots are Western states that, like Arizona, have come to rely increasingly on voting by mail. This is because individuals who receive mail-in ballots often show up at the polling place—whether because they miss the mail-in deadline, misplace the ballot, or prefer to vote in person—and election administrators use the provisional ballot

process to make sure that those voters do not vote twice. But, as in other states, such provisional votes are generally eventually counted. Accordingly, the fact that so many Arizonans are on the vote by mail list cannot explain Arizona's unusually high number of rejected ballots.

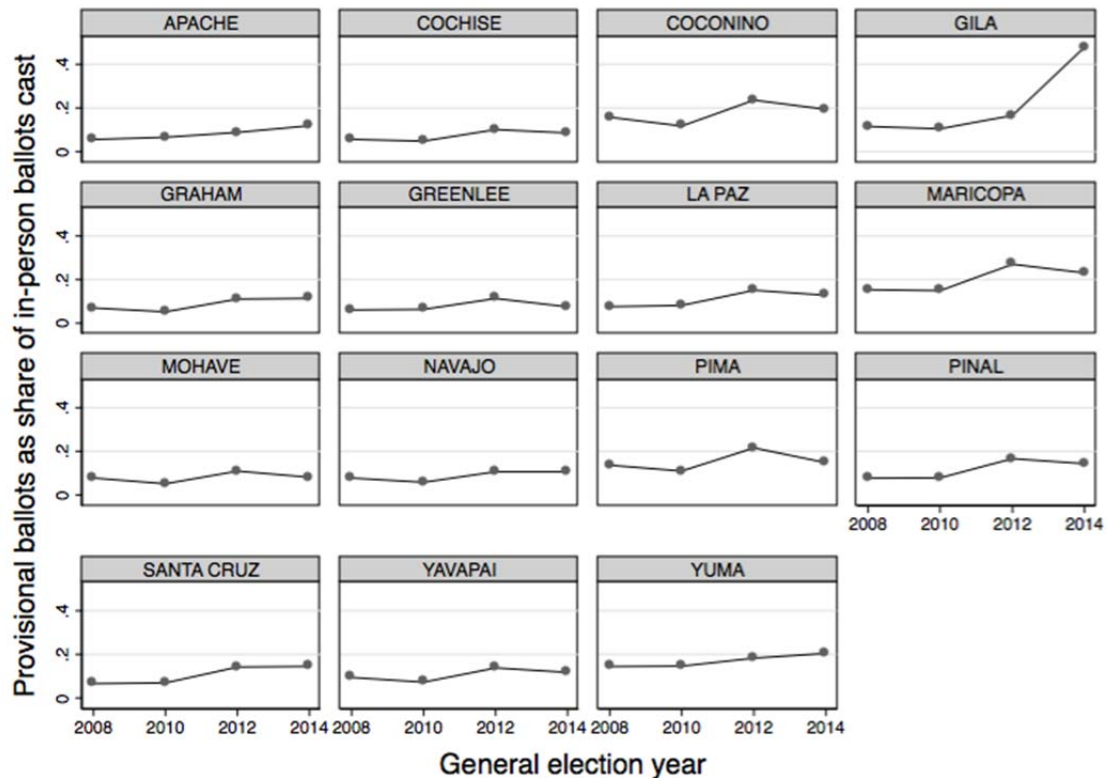
Figure 6: Rejected out-of-precinct ballots as a share of in-person ballots cast according to 2012 EAC Report



What sets Arizona apart from other states is its persistent problem with out-of-precinct voting. Figure 6 displays out-of-precinct ballots as a share of all in-person ballots cast in the 2012 general election. Arizona is clearly in a class by itself, with almost 11,000 rejected out-of-precinct provisional ballots in 2012 and 3,500 in 2014. No other state comes close. This indicates that something is clearly going wrong in the process through which election administrators: assign voters to polling

places in precincts, inform them about often-shifting locations in the weeks before the election, inform those voters who arrive at the wrong polling place about their correct polling location, and then discard provisional ballots after the election. It is simply not plausible that 11,000 Arizonans stood in line to vote in 2012 and went to the trouble of casting a provisional ballot that they knew would not be counted.

Figure 7: Provisional ballots as a share of in-person ballots cast according to EAC reports, Arizona counties



The EAC also collects data from Secretaries of State on individual counties. Figure 7 zooms in on Arizona's 15 counties, displaying provisional ballots as a share of all in-person ballots in each general election from 2008 to the present. It demonstrates that provisional ballots are especially common in Arizona's three most populous counties, including Maricopa—where they accounted for around one

in three in-person ballots cast in 2012—as well as Pima and Pinal. Among the less populous counties, provisional ballots as a share of election-day voting are relatively common in Coconino, Yuma, and Gila.

Figure 8: Total rejected ballots and out-of-precinct ballots as shares of in-person ballots cast according to EAC reports, Arizona counties

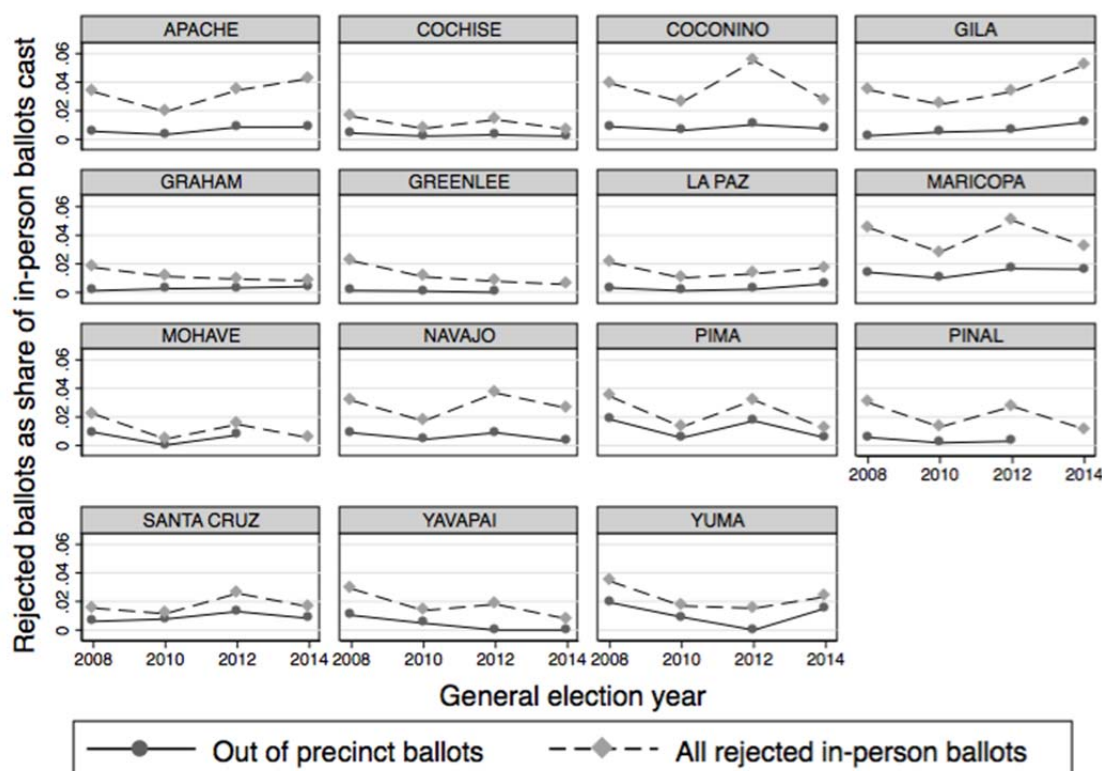


Figure 8 turns attention to only those provisional ballots that were rejected, as well as the sub-set of ballots rejected because of out-of-precinct voting. The dashed line shows that rejected ballots have been most common in Maricopa County, as well as the less urbanized counties of Apache, Coconino, Gila, and Navajo. Following the general pattern, Pima and Pinal have relatively high rates of ballot

rejection during presidential years, and lower but nevertheless substantial rates (around two percent) during mid-term elections.

Figure 8 also shows that out-of-precinct voting has been most pronounced in the urbanized counties of Pima and above all Maricopa, where almost two percent of all ballots are routinely invalidated due to voters casting ballots at the wrong location. In those two counties alone, almost 10,000 votes were thrown away for this reason in the 2012 general election. Coconino has also experienced a problem with out-of-precinct ballots, especially in presidential election years.

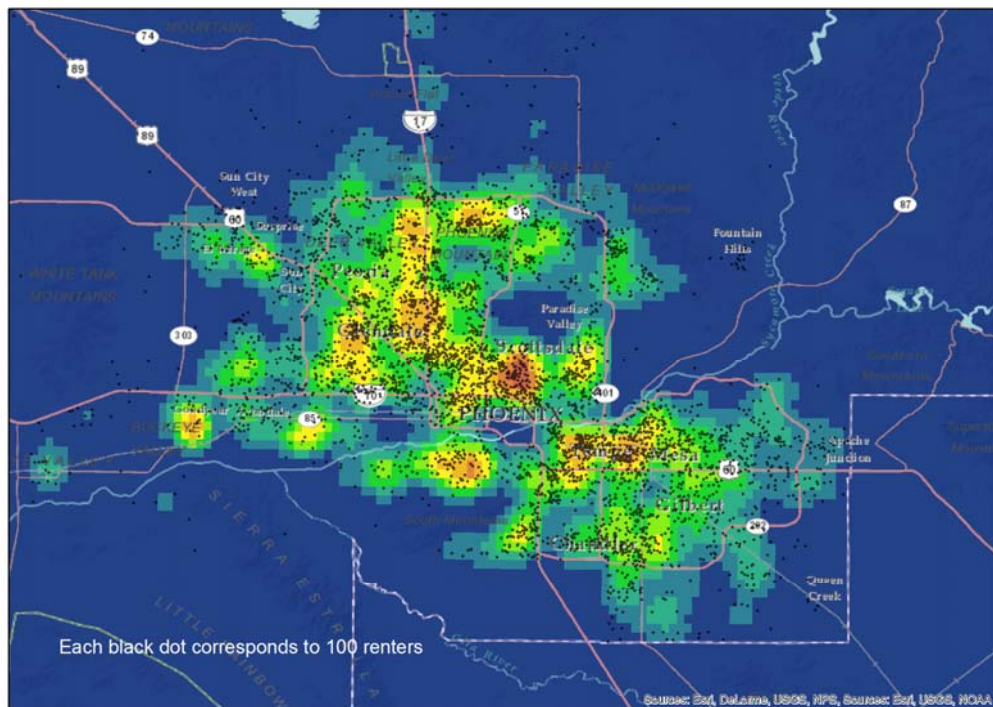
Who Votes in the Wrong Precinct? A Case Study of Maricopa County

Since around three quarters of Arizona's out-of-precinct votes are cast in Maricopa County, it is the natural place to look for a deeper understanding of the phenomenon of out-of-precinct voting. I have received a list of the name and address of every voter in Maricopa County who cast a provisional ballot in the general elections of 2008, 2010, 2012, and 2014, including a code that specifies the reason the voter was asked to cast a provisional ballot, as well as an indicator for whether the ballot was ultimately counted. The data also include codes for the precinct where the provisional ballot was cast, as well as the precinct assigned by election administrators to the voter's registration address.

My analysis begins by simply mapping the rejected out-of-precinct provisional ballots. Figure 9 uses the household addresses of the 7500 individuals who cast invalid out-of-precinct ballots in the November 2012 general election to produce a heat map that gets darker in neighborhoods where there are clusters of

It is possible to get a sense for the correlates of out-of-precinct voting by visualizing some additional census data, superimposed on this heat map. First, as argued above, out-of-precinct voting is most likely among renters and individuals with unstable rental histories. Figure 10 superimposes data from Maricopa census block groups²¹ on the number of all householders who rent (rather than own) their dwellings. Each small dot represents 100 renters. It is not surprising to see that out-of-precinct voting is far more pronounced in corridors with more renters, and less common in areas with high rates of home ownership.

Figure 10: Heat map of out-of-precinct ballots cast in 2012 general election and renters



²¹ The census block group is the smallest unit of census geography at which such data are available.

voters reside. First, since each individual out-of-precinct voter is geo-coded, it is possible to aggregate these votes to the level of census block groups, of which there are 2,505 in Maricopa County. For each block group, in order to get a measure of the prevalence of out-of-precinct voting, I then divide the number of out-of-precinct provisional ballots by the number of registered voters residing in the block group. I can then estimate a simple linear model in order to examine whether block groups with larger shares of renters vis-à-vis owners, less stable populations, or larger minority populations have higher rates of out-of-precinct voting. Specifically, I regress the natural log of the out-of-precinct vote share on the natural logs of these census variables via ordinary least squares (OLS), which produces regression coefficients that can be easily interpreted.

The results suggest that a doubling of the share of the population that rents rather than owns—say going from 25 percent renters to 50 percent—is associated with a 14 percent increase in the share of registered voters who cast out-of-precinct ballots. A similar doubling of the percent of the block-group population that has moved in the last year is associated with a 9 percent increase in the share of ballots that are cast out-of-precinct. These results are statistically significant at the .001 level. Residential churn in neighborhoods with frequent moves between rentals is clearly an important part of the story of out-of-precinct voting in Maricopa County.

Similar regression models have also been estimated with race and ethnicity as the independent variables. A doubling of the Hispanic voting-age population—moving from a block group with a 25 percent Hispanic share to a 50 percent share—is associated with a striking 19 percent increase in the out-of-precinct voting rate.

The effect is roughly the same for a doubling of the black voting-age population. Both effects are highly statistically significant.

While these effects are substantively large and statistically significant, any analysis of an individual-level phenomenon like out-of-precinct voting that uses aggregate data from geographic units like census block groups or counties may fall prey to so-called aggregation bias. Since block-groups are not perfectly racially homogeneous, one might cast doubt, for example, on the estimated size of the relationship between race and out-of-precinct voting by pointing out that some of the out-of-precinct ballots in Hispanic-majority census blocks maybe have been cast by non-Hispanic whites.

While individual-level information about home ownership and residential moves are not available, it is possible to obtain better inferences about out-of-precinct voting by race and ethnicity using individual data. Geo-coded addresses are valuable not only because they allow one to make visualizations like those above, but because the placement of individuals in census blocks and tracts helps a great deal in drawing inferences about the race and ethnicity of individuals. Aggregate census data about the composition of the individual's neighborhood can be combined with information about the individual's surname to develop very accurate estimates of the individual's race and ethnicity. This approach initially gained traction in research using medical records, where public health researchers wished to make inferences about race based on individual records in which information about names and residential geography was available without racial or ethnic self-

identification.²² This approach makes use of the frequency of specific last names in the population, which can be determined from past individual-level Census data, and the frequency of racial groups in local areas according to the United States Census Department.

This approach to estimating the race and ethnicity of individuals has recently become quite common not just in academic studies, but in court cases related to the Voting Rights Act, which often require estimates of turnout and voting behavior by race and ethnicity.²³ The state of Arizona and county of Maricopa already use a less sophisticated version of this approach—relying only on surnames rather than the additional geographic information—in their own internal studies of ethnicity and voting.²⁴

In a recent academic paper, Kosuke Imai and Kabir Khanna use large datasets in which the self-declared ethnicity of individuals is known, and demonstrate that this approach allows researchers to estimate ethnic and racial identities with a very high level of accuracy. They also demonstrate that for both African Americans and Hispanics, estimates that include geographic information are more accurate than those that rely exclusively on surnames. For example, the most common surnames among African Americans are Smith, Johnson, and Williams. According to the Census

²² See M. N. Elliott, A. Fremont, P. A. Morrison, P. Pantoya, and N. Lurie (2008): “A New Method for Estimating Race/Ethnicity and Associated Disparities where Administrative Records Lack Self-Reported Race/Ethnicity.” *Health Services Research* 43, 1772-1736, and M. N. Elliott, P. A. Morrison, A. Fremont, D. F. McCaffrey, P. Pantoya, and N. Lurie (2009): “Using the Census Bureau’s Surname List to Improve Estimates of Race/Ethnicity and Associated Disparities.” *Health Services and Outcomes Research Methodology* 9, 2: 69-83.

²³ For instance, see the declaration on behalf of the plaintiffs by Stephen D. Ansolabehere in *Marc Veasey et al. v. Rick Perry et al.* (2:13-cv-193), and the declaration filed on behalf of the defense by Professor Nolan McCarty in *Ohio Democratic Party et al. v. Husted et al.*, Case No. 2:15-cv-1802 (S.D. Ohio 2015).

²⁴ See, for example, the presentation entitled “2008 Presidential Preference Election Review,” presented to the Maricopa County Community Network Meeting, February 20, 2008.

surnames data, however, the majority of Americans with these surnames are white. Thus a Smith in a rural white Arizona Census block will receive a very high white probability, while a Smith in an overwhelmingly African American census block in Phoenix will receive a high black probability.

I use Imai and Khanna's open-source software to implement this approach for voters in Maricopa County.²⁵ Specifically, I have geo-coded and race-coded all registered voters in the 2016 Maricopa County voter file that was provided to the Arizona Democratic Party in April 2016, as well as all voters who cast provisional ballots in 2008, 2010, 2012, and 2014.²⁶

Since Native Americans make up a very small part of the population in most states, Imai and Khanna did not create a separate category for Native Americans when generating their algorithm. Native Americans are subsumed, along with individuals reporting more than one race as well as Hawaiians and Pacific Islanders, in the category of "others." However, in order to come up with an estimate of Native American identity, I can use data from the prevalence of Native Americans in the individual voter's census block to estimate the probability that the individual is Native American, given the individual's probability of falling into the "other" category produced by the Imai and Khanna algorithm. Using this approach, an individual with a common Native American surname like Begay, when living in a census block with a sizable Native American population, will receive a high "Native American probability."

²⁵ Computer code and documentation are available at: <https://github.com/kosukeimai/wru>

²⁶ I was unable to code a small number of individuals whose residential addresses were suppressed in the filed I received.

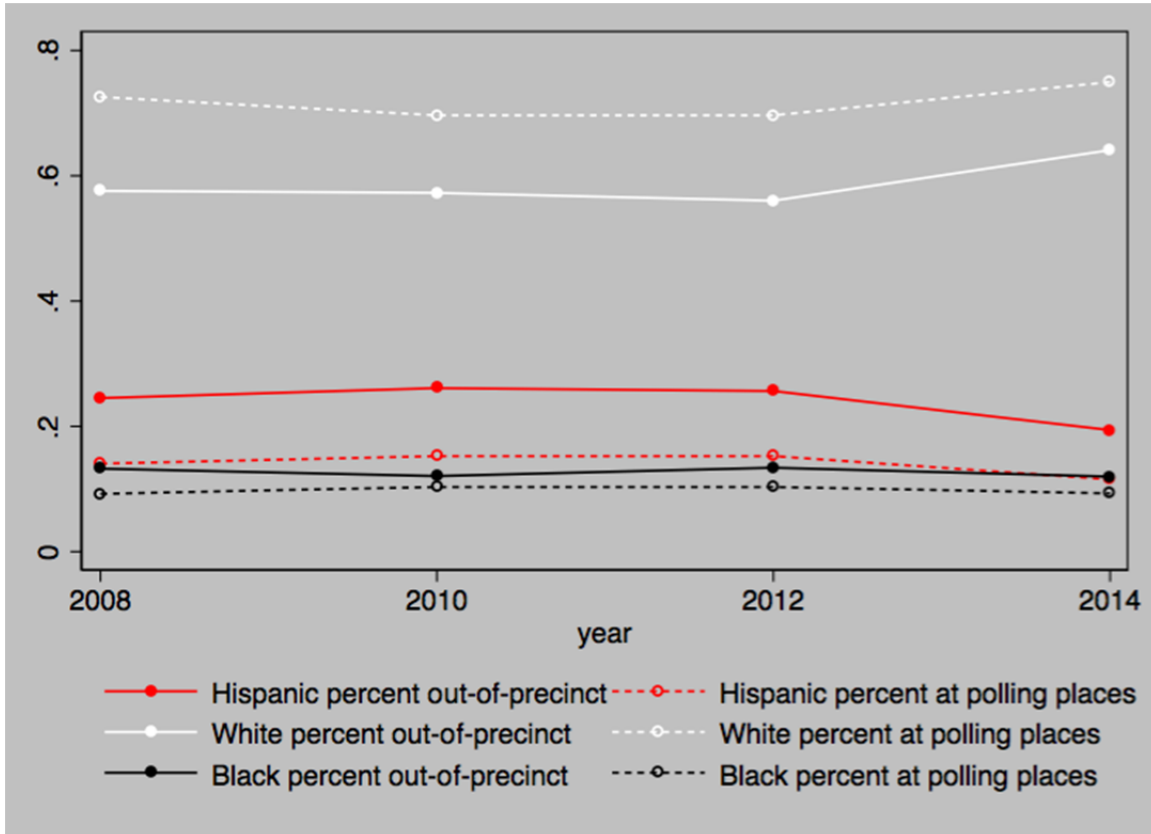
Next, I examine all registered voters whose ballots were classified as out-of-precinct, and calculate the share of such ballots cast by African Americans, non-Hispanic whites, Hispanics, Asians, and Native Americans in each election. The three largest groups are represented in Figure 12 with solid dots connected by solid lines, with a different color corresponding to each group. For comparison, from the voter file I also calculate the size of each of these groups as a share of all voters who showed up to a polling place to vote, either by traditional ballot or provisional ballot, in each election. These are represented with hollow dots and connected by dashed lines according to the same color scheme.

Figure 12 confirms that minorities have been vastly over-represented among those casting ballots in Maricopa County classified as out-of-precinct. For instance, in 2012, while 70 percent of those visiting polling places were white, only 56 percent of those casting ballots classified out-of-precinct were white. While 10 percent of those casting ballots classified out-of-precinct were African American, 13 percent of the ballots invalidated due to being classified in the incorrect precinct were cast by African Americans. And while 15 percent of those casting votes at polling places were Hispanic, 26 percent of the invalid ballots classified in the wrong precinct were cast by Hispanics.²⁷ These disparities have been quite persistent over

²⁷ Because of the very small numbers, I do not include Native Americans in this figure. Native Americans are also somewhat over-represented among out-of-precinct voters, making up about 1.1 percent of those casting votes at polling places, and 1.3 percent of those casting out-of-precinct ballots. See below.

time, and have also been noted in the research of the Maricopa County Elections Department.²⁸

Figure 12: Out-of-Precinct Provisional ballots cast by race/ethnicity in general elections in Maricopa County, AZ



Perhaps an even more intuitive way to approach these data—especially for the smaller groups— is to calculate the share of each group that cast a provisional ballot in each election. This is presented in Figure 13.

²⁸ See, for example, the presentation entitled “Provisional Ballots 2012,” Maricopa County Elections Department Community Network Meeting, January 30, 2013.

Figure 13: Out-of-Precinct Provisional ballots are share of ballots cast by race/ethnicity in general elections in Maricopa County, AZ

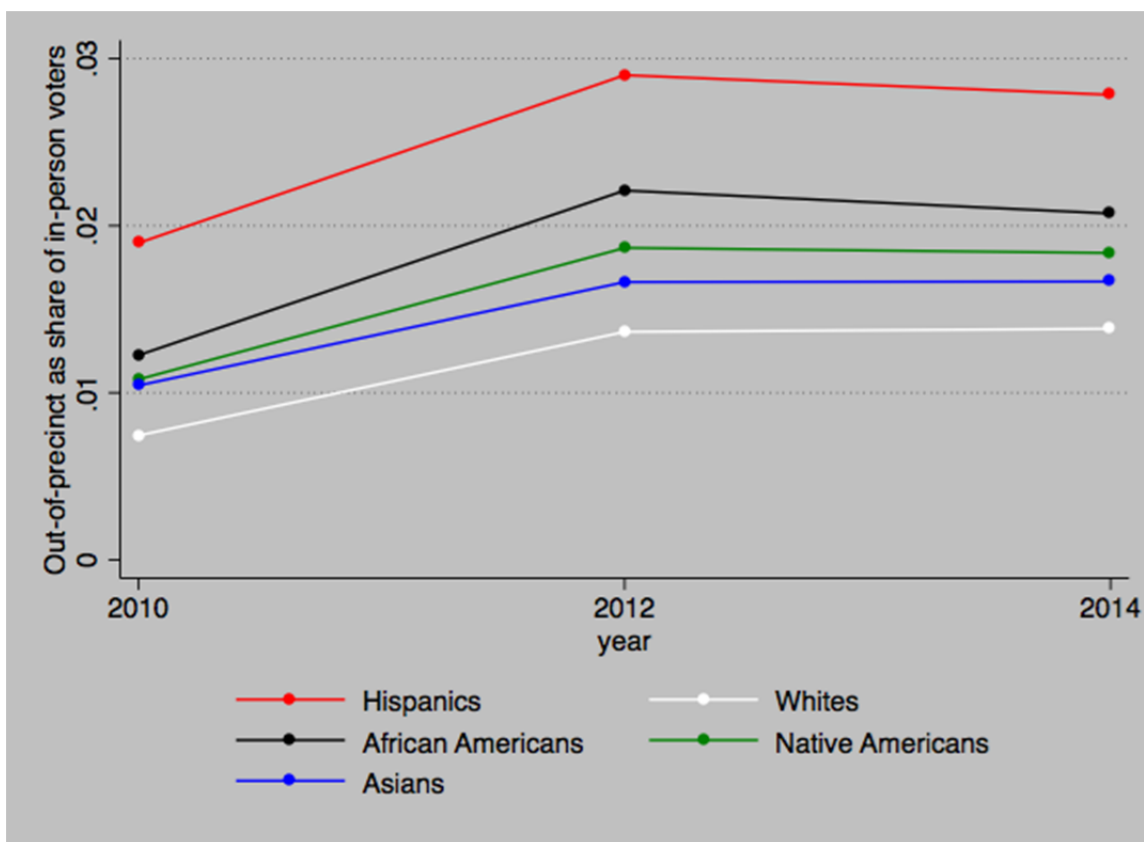
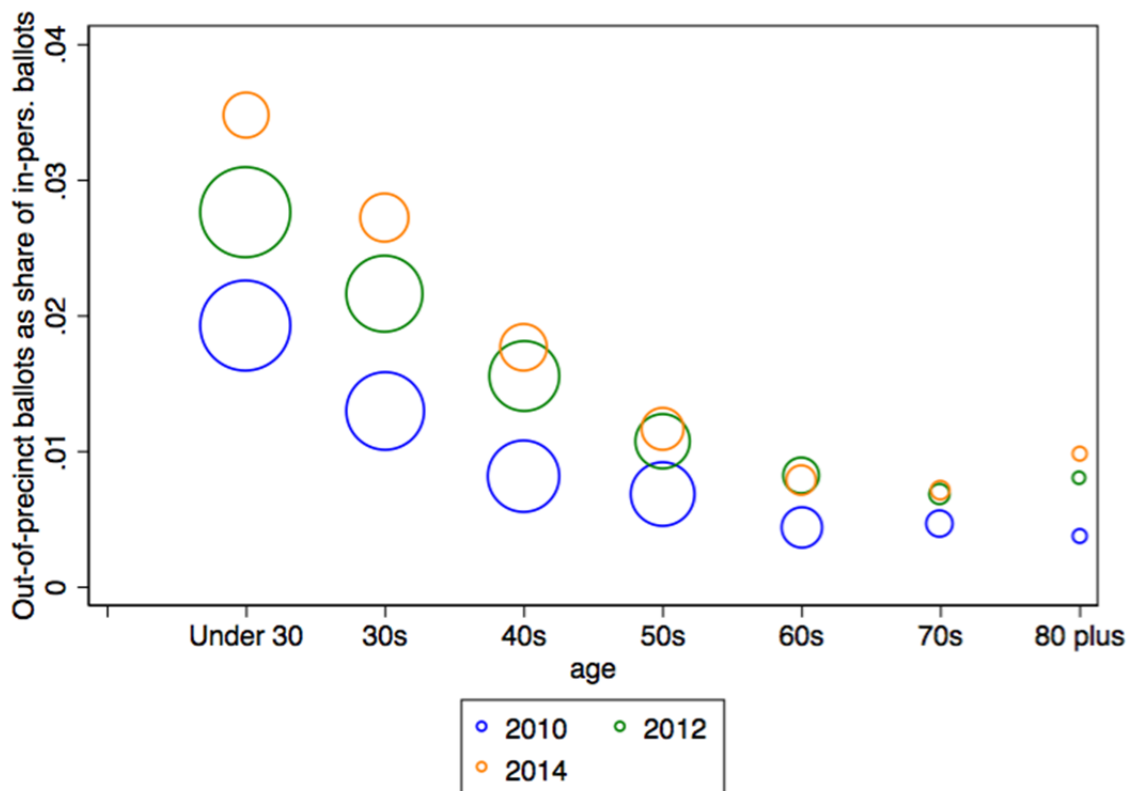


Figure 13 shows that while close to 3 percent of Hispanics who visited polling places in 2012 ended up casting ballots that were categorized as “out of precinct,” the figure was less than 1.4 percent for whites. In other words, the rate of casting ballots categorized out-of-precinct was more than twice as high for Hispanics. The rate of ballots categorized out-of-precinct was 62 percent higher for

African Americans than for whites, and 37 percent higher for Native Americans than for whites.

The Maricopa County voter file includes the birth year of each registered voter, thus allowing me to calculate the prevalence of out-of-precinct voting among registered voters in different age groups as well. Figure 14 plots rejected out-of-precinct ballots as a share of all election-day ballots cast for various age groups in the general elections of 2010, 2012, and 2014. To provide a sense for the relative size of these groups, the area of each circular data marker corresponds to the raw number of out-of-precinct ballots cast by the group in question.

Figure 14: Out-of-Precinct Provisional ballots cast by age in general elections in Maricopa County, AZ



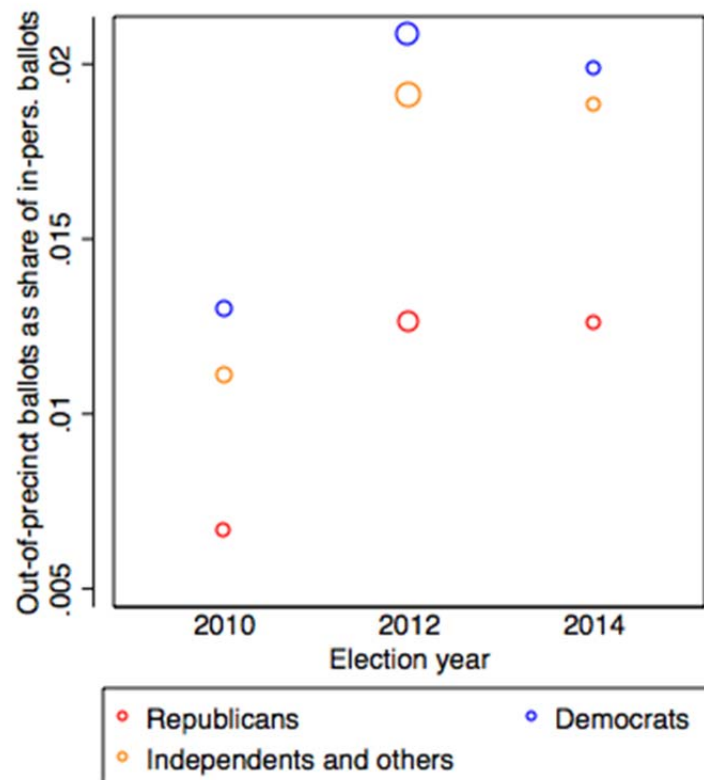
It is very clear from Figure 14 that out-of-precinct ballots are cast overwhelmingly by young voters. For instance, almost three percent of all registered voters under the age of 30 for whom we have some record of a visit to a polling place on November 6, 2012 cast an invalid out-of-precinct ballot. In the 2014 Mid-term, this figure jumped to almost 3.5 percent. In each general election the pattern is the same: the prevalence of out-of-precinct voting declines with age, and levels off below 1 percent for voters above the age of 60.

Figure 14 also reveals that the confusion among young voters about precinct location appears to be increasing over time. While Figure 14 shows a smaller circle in 2014, indicating that the raw number of out-of-precinct ballots has decreased, this must be understood in the context of a notoriously low-turnout mid-term year in which a greater share of those who participated chose to do so via early voting. As a percent of in-person ballots cast, out-of-precinct voting among the young has been steadily increasing.

Finally, given that young people, renters, and minorities are more likely to be Democrats than Republicans, it would not be surprising to discover that out-of-precinct ballots are cast disproportionately by Democrats. The Maricopa County voter file includes the party registration of each voter for the purposes of allocating the proper ballots in primaries. Using these data, Figure 15 calculates out-of-precinct ballots as a share of election-day ballots for registered Democrats, Republicans, and “others,” which include independents, those who did not register for a party, and those who registered for one of the smaller parties.

The data displayed in Figure 15 are striking. Republicans are far less likely to cast invalid out-of-precinct ballots than are Democrats and others. In 2012, the out-of-precinct voting rate for Democrats was 65 percent higher than that for Republicans. In the last two elections, the votes of roughly one in every fifty registered Democrats showing up to vote in person in Maricopa County were invalidated due to being at the wrong precinct. The same was true of only one in every eighty registered Republicans.

Figure 15: Out-of-Precinct Provisional ballots cast by party registration in general elections in Maricopa County, AZ



Extension to Pima and Coconino Counties

The Maricopa Case study is important above all because Maricopa County constitutes 61 percent of Arizona's population. I have also received lists of provisional ballots cast in the general elections of 2010, 2012, and 2014 in Arizona's second-largest county—Pima—and for 2014 in Arizona's 7th largest county—Coconino. Together, these three counties account for 78 percent of Arizona's population. As demonstrated in Figure 8 above, Pima was also among the counties with relatively large numbers of out-of-precinct ballots, at least in presidential election years.

Using the same techniques described above, I geo-coded and race-coded the January 2015 voter files provided by the Democratic National Committee for these two additional counties. I then merged the lists of provisional ballots and replicated the analyses described above.

In Pima County, the results were rather similar to those in Maricopa for the general elections of 2010 and 2012. The rates at which African Americans and Hispanics cast out-of-precinct ballots were significantly higher than the rate for whites in both years. In 2012, the rate for African Americans was 37 percent higher, and for Hispanics it was 123 percent higher, than that for whites. The rate was also higher in 2012 for Native Americans by 47 percent. Each of these is statistically significant. These racial/ethnic differences were also statistically significant in the 2010 mid-term general election. However, the number of out-of-precinct ballots was smaller in 2014, and with the exception of Hispanics, these differences lost statistical significance in that year. As in Maricopa County, Democrats are more likely to cast out-of-precinct ballots than are Republicans in Pima County, though

again, statistical significance drops away in 2014. And as in Maricopa, in each election, young voters were far more likely to cast out-of-precinct ballots.

In Coconino County I only have individual-level data on out-of-precinct ballots for the low-turnout general election of 2014, in which there were only 95 out-of-precinct ballots cast. Minorities were somewhat more likely to cast these ballots than whites, but only the difference for Native Americans is statistically significant. Once again, out-of-precinct ballots were far more likely to be cast by younger voters.

V. THE LOCATION OF POLLING PLACES IN MARICOPA COUNTY

What explains the number of ballots apparently cast in the wrong polling places? In this section, I present evidence that there are two broad explanations for these apparent errors in Maricopa County. First, it appears that in fact many of these ballots were *not* cast in the wrong precinct, and may have been misclassified as such and improperly rejected by election officials.

Second, of the ballots that were incorrectly cast, many of these errors appear to have been caused by confusion among voters due to the placement of polling places. Evidence for this argument takes two forms. First, I examine a small set of precincts to illustrate in a very concrete manner the types of errors made by voters. Second, using a more general statistical analysis of voting in Maricopa County, I show the errors illustrated in these examples are not unique to these cases, but are in fact systematic manifestations of the ways in which the geography of precinct location can affect search costs and information costs for voters. As part of this analysis, I show that confusion about the location of polling places arises not just

from odd placement decisions, but also from election-to-election changes in polling place locations.

Finally, after developing a clear general relationship between polling place locations, turnout, and out-of-precinct ballots, I show that the impact of these factors falls disproportionately on racial and ethnic minority groups.

Valid Ballots Incorrectly Discarded

According to the data collected by Maricopa County, many voters whose ballots were classified as having been cast in the wrong precinct did not make a mistake at all. Their ballots were marked as “out-of-precinct” and discarded even though their registration precinct matched the precinct in which the provisional ballot was cast, and the official registration address provided by Maricopa County in its list of provisional voters was inside the precinct whose polling place they visited. The total number of such disenfranchised voters was 2,645 in 2012—around 35 percent of all ballots categorized as “out of precinct.” The problem was not isolated to a few precincts. In fact, at least one such case was discovered in 87 percent of the precincts.

Nor was the problem limited to 2012. In 2008, the number of such ballots was 2,309—around 25 percent of all “out of precinct” ballots. In the 2010 and 2014 mid-term, such ballots constituted 33 and 20 percent of all “out of precinct” ballots, respectively. It is not clear why these ballots were rejected. They do not appear to be disproportionately composed of new registrants; however, a very large number have records indicating that their registration status was updated about one month before the election. A possibility is that the disenfranchised voters were individuals

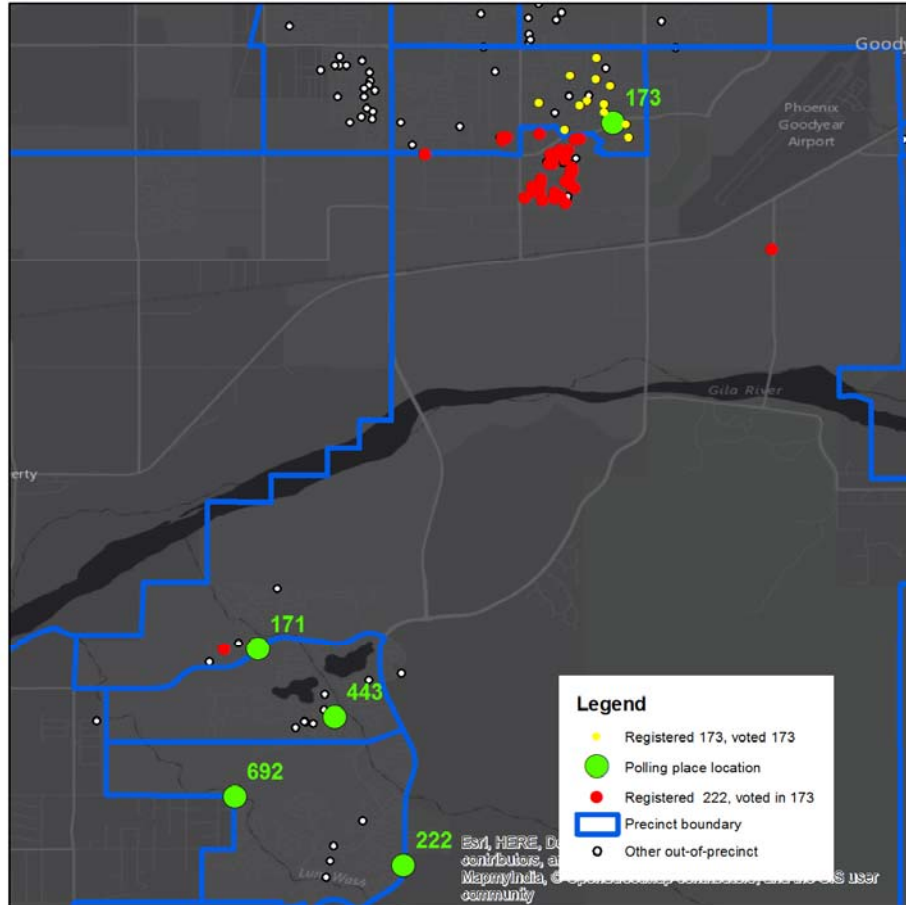
who had recently moved and attempted to update their address records but did not appear on the list at the polling place.

Errors caused by Polling Locations: Illustrative Cases

In some of the maps presented above, the Phoenix suburb of Goodyear emerged as a hotspot for out-of-precinct voting. Figure 16 focuses on precinct number 173, one of the more pronounced clusters of out-of-precinct votes in Goodyear. The locations of the 2012 general-election polling places are indicated in bright green. The white dots correspond to residential addresses of out-of-precinct voters who submitted provisional ballots somewhere in the area covered by the map. The yellow and red dots focus on two specific classes of these disenfranchised voters in precinct 173.

First, as noted above, many of the voters whose ballots were discarded as “out-of-precinct” appear to have voted in their proper precinct. Data provided by Maricopa County include codes that indicate the precinct in which the provisional vote was cast as well as the official registration precinct of the individual. In precinct 173 in Goodyear, those codes are the same (0173) for 12 individuals. The markers for these individuals are highlighted in yellow. As the map demonstrates, these individuals are recorded as having had official registration addresses inside precinct 173. They are nevertheless recorded as having cast invalid, uncounted provisional ballots for reasons of casting a ballot at the wrong polling place in Precinct 173. Unless the data submitted by the county have been submitted in error, these individuals were disenfranchised in spite of having appeared at the correct polling place.

Figure 16: Polling place locations and out-of-precinct ballots cast in the vicinity south of Maricopa precinct number 173



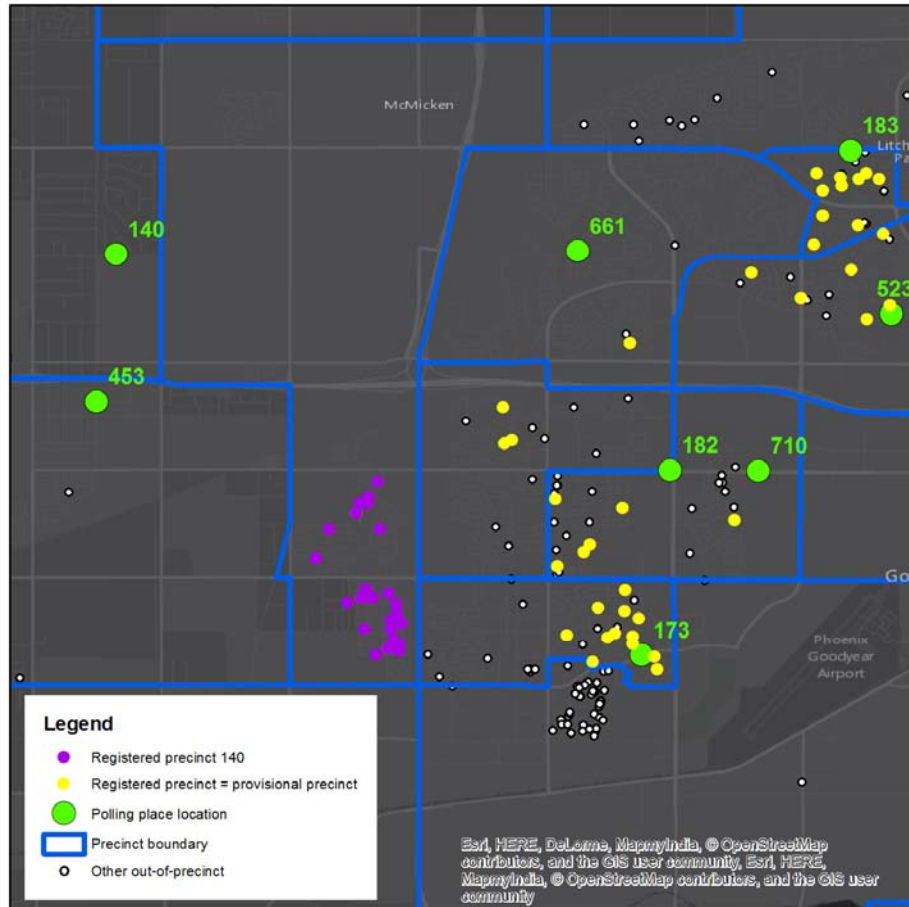
Next, the red dots mark the official residential addresses of a group of 44 voters who were officially registered to vote in precinct 222, but showed up on Election Day at the Desert Star School, the polling location for precinct 173. It is easy to understand how they might have made this mistake. Polling place 173 is the local elementary school, and the only polling place in the vicinity. It is within easy walking distance, and is the polling place for most of the neighbors and other parents at the school, yet due to a bizarre placement of the Southern border of

precinct 222, these voters were required to travel 15 minutes by car (according to google maps) to vote in polling location 222, passing four other polling places along the way.

Note another feature of the green dots and blue lines in Figure 16. The green dots are either directly on top of, or very close to, the blue precinct boundaries. None of these precincts are anywhere near the geographic center of the precinct. This creates obvious confusion on one side of the boundary, where a very proximate polling place attended by one's friends and neighbors will be "wrong" and the "correct" polling place will be in a different neighborhood. Note, for instance, the white dots registered in precinct 222 but located just north of polling place 171, representing voters who made the mistake of visiting 171 rather than driving the circuitous route to number 222. And note the line of voters just west of precinct 222 who made the mistake of driving (or walking) to precinct 222 rather than traveling to the other border of the precinct to polling place number 692. Due to the policy of locating polling places on precinct boundaries, in some cases the "wrong" polling place appears to be physically located in, or across the street from, the precinct to which many voters are assigned.

Next, let us stay in Goodyear and pan slightly to the north. Again, voters whose ballots were reported as invalid due to out-of-precinct voting in spite of having cast ballots at the correct polling place are indicated with yellow dots. Clearly the problem of incorrectly discarded ballots is not limited to precinct number 173.

Figure 17: Polling place locations and out-of-precinct ballots cast in the vicinity north of Maricopa precinct number 173



In the area covered by this map, the same thing occurred in polling places 140, 661, 182, 710, 523, and 183. The remaining dots—those that appear to be “true” out-of-precinct ballots, demonstrate an interesting spatial pattern. They are clustered in corners and along borders of precincts on the side that is farthest from the polling place. Most notably, in the Southern appendage of the precinct assigned to polling place 140, the correct polling place, the Scott Libby School (the green

marker labeled 140), is rather far away, across a freeway, and *located outside the precinct*, while there are at three or four more proximate polling places.

Thus it is not surprising that the 28 voters marked in bright violet in Figure 17 did not make it to the correct location, which is located far away on the other side of Interstate 10. Almost all of these voters seem to have made the calculation that their polling place could not possibly be on the other side of the interstate, since other polling places were open in their neighborhood.

Also noteworthy is an array of white dots in the western appendage of Precinct 710. It is not surprising that these voters would have mistakenly gone to the geographically proximate polling place 182—the Compass Church—instead of passing it and driving further down the street in order to cast their ballot at polling location 710—the Skyway Church.

In contrast with such examples, note that polling place 661 is the only polling place in this map that is located near the center of its precinct and does not lie close to a boundary. It also stands out for having received only two “true” out-of-precinct ballots.

In fact, the placement of polling places on or near precinct boundaries seems to be the norm. Perhaps this arises from the need to secure churches and schools as polling places combined with the desire to use the major thoroughfares on which they are located as precinct boundaries. This practice, however, combined with long and oddly shaped precincts, evidently causes considerable confusion and, as demonstrated, leads to the disenfranchisement of numerous voters due to the state’s practice of not counting provisional ballots cast out of precinct.

Figure 18: Polling place locations and out-of-precinct ballots cast in the vicinity of precincts 26 and 398

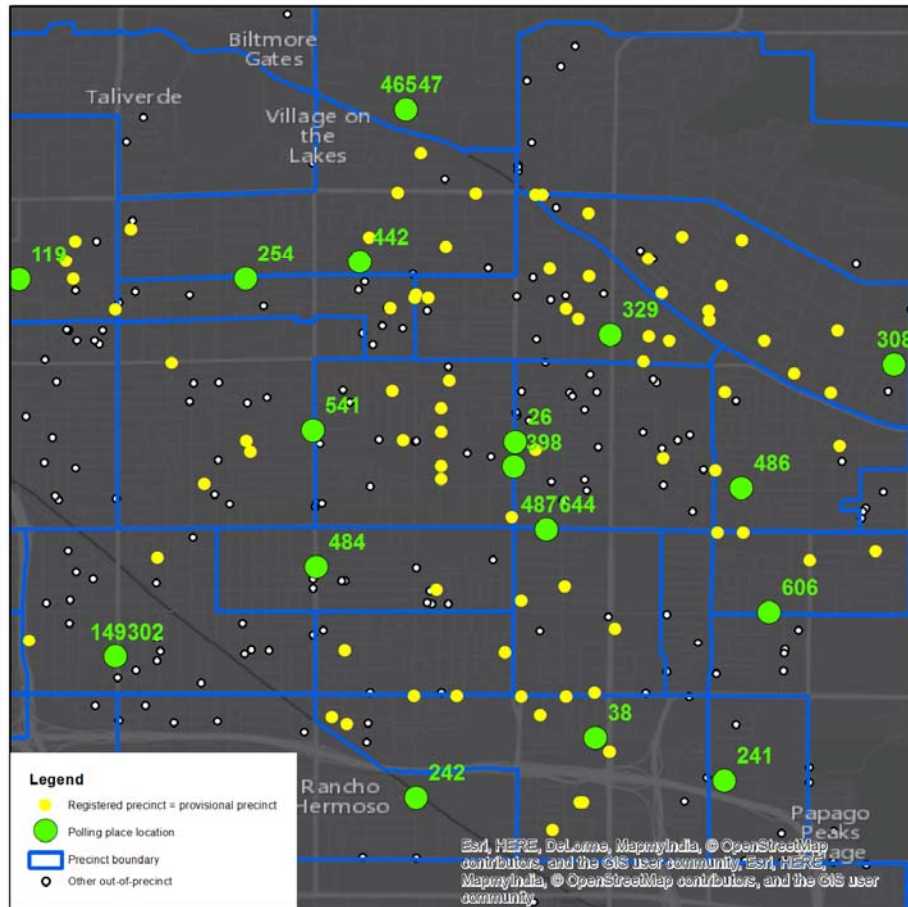


Figure 18 zooms in on the neighborhood just north of the Airport, again using yellow dots for those for whom records indicate the ballot was improperly rejected. Much like the findings from the previous case studies, the remaining out-of-precinct votes are often cast by individuals residing along precinct boundaries, and those living relatively far from their assigned polling place in the presence of

other proximate options. Figure 18 also reveals another related problem. Sometimes when a precinct does not have its own polling place, two precincts share the same facility. For instance, precincts 149 and 302 shared the St. Agnes Parish Center. However, within the same facility two distinct polling places were set up, and it was evidently up to individual voters to know their precinct number and choose the appropriate line. Based on the precinct codes in the data provided by Maricopa County, most of the white dots in precincts 149 and 302 represent individuals who guessed wrong, got to the front of the line, and rather than being redirected to the other polling station were offered a provisional ballot that was ultimately discarded.

Something similar happened with precincts 26 and 398 as well as 487 and 644. The latter two were both located in Memorial Presbyterian Church, while 26 and 398 were located in two churches across the street from one another, both at the corner of North 40th and East Osborn Road. Thus a voter who jotted down the street intersection of the correct polling place before leaving home would have a 50 percent chance of having their ballot counted. Again, while a small number of the white dots on the map in these precincts represent people who tried to cast ballots elsewhere in the neighborhood, the vast majority of the dots in the precincts represent people who guessed wrong between two very similar options.

Systematic analysis of geography and out-of-precinct voting

The maps and examples above revealed several interesting features of the geography of out-of-precinct voting. It is important to move beyond illustrative examples and explore these phenomena in a more systematic way.

First, as previously noted, fully 35% of ballots discarded as being “out of precinct” were discarded in error. As these mistakes were not related to voter confusion about polling places, but rather some type of confusion upon either the poll worker or other election administration staff in the classification of these votes, the remainder of this section focuses only on “true” out-of-precinct votes.

In the examples above, voters did not miss the target by much—they visited polling places in their neighborhood that seemed quite rational. This is also true more generally in Maricopa County. I have calculated the distance between every out-of-precinct voter’s address and his or her assigned precinct, as well as the distance between the residential address and the precinct in which the invalid provisional ballot was cast. For around 25 percent of those casting “true” out-of-precinct ballots in the 2012 general election, the provisional ballot was cast in a precinct that was actually *closer* to the voter’s address than the assigned polling place (or equidistant due to being in the same building). The median distance between the polling place where an “out-of-precinct” vote was cast and the voter’s home was only two miles. Only a relatively small minority of out-of-precinct voters—around 12 percent—are missing the target by a wide mark by casting their ballot more than 10 miles from the correct polling place, perhaps voting near the workplace or at the polling place linked to a previous address.

When choosing a spatially proximate precinct to visit on Election Day, why do voters so often choose the wrong one? A possibility raised above is that the majority of polling places are located on the border of a precinct, such that the correct location is clear for voters living on that side of the precinct, but for voters

on the other side of the precinct, another polling place—perhaps also straddling the border—might seem more “natural.” A way to examine this is to focus exclusively on variation within precincts and examine whether an individual’s probability of casting an “out-of-precinct” vote increases with his or her distance from the appropriate polling place. Using the March 2013 version of the Maricopa County voter file provided to the Democratic National Committee, I have calculated the distance between every registered voter and his or her assigned polling place. I find that out-of-precinct ballots are cast at a 30% higher rate among individuals who are far from their assigned polling place (more than 1.4 miles) than those who live close to their assigned polling place (less than 0.4 miles).

Moreover, this result holds even using more sophisticated statistical analyses that rule out the possibility that this correlation is driven by higher rates of out-of-precinct voting in larger precincts. Using linear regression models with fixed effects, I find that it is the case that among voters in the same precinct, the farther one lives from the polling place, the more likely one is to cast an “out-of-precinct” ballot. The placement of polling places within precincts is clearly part of the story of out-of-precinct ballots.

Another lesson from the examples above is that confusion arises in areas where many polling places are clustered in the same neighborhood. In some settings, there is a rational allocation of precincts and polling locations such that a single polling place near the center of a neighborhood serves as a focal point, and voters are unlikely to make a mistake. In other settings, however, multiple polling places are placed in close proximity to one another—sometimes in the same

building or across the street from one another—imposing higher information costs on voters. To capture this, I have calculated a one-mile buffer around each voter, and counted up the number of polling places in each buffer. This variable ranges from zero to six. Voters assigned to a polling place that is within a mile of two or more other polling places cast out-of-precinct ballots at a rate 13 percent higher than those whose assigned polling place is not in close proximity to other polling places. This relationship is statistically quite strong; using a linear statistical model with standard errors clustered by precinct reveals that the relationship between the number of proximate polling places and the prevalence of out-of-precinct ballots is statistically significant.

Finally, one of the truly unique features of election administration in Maricopa County is the fact that the city of Phoenix sometimes uses an entirely different polling place scheme for its local elections, sometimes on the same day as general elections. Thus we might expect to see that this creates extra confusion about polling place locations in Phoenix. Indeed this is the case. The “true” out-of-precinct voting rate is 43 percent higher in Phoenix than in the other jurisdictions in the County. There is a notable jump in out-of-precinct voting when one crosses the boundary of Phoenix, even when the neighboring jurisdiction is similar in terms of race and income. In a multiple regression using all registered voters in Maricopa County, residence in Phoenix is a significant predictor of out-of-precinct voting even when controlling for demographic differences between Phoenix and its neighbors.

Changes in Precinct Locations

In short, the location of polling places and precinct boundaries in Maricopa County is such that voters with the best of intentions can easily miss the target and get in line at the wrong polling place in a given election. But we have not yet considered the possibility that the target itself is moving from one election to another. Leaving aside the constantly shifting precinct structure for Phoenix city elections, special elections, and the temporary precinct consolidations associated with PPEs, let us examine the precinct consolidation that took place just before the 2012 presidential election.

Between 2010 and 2012, Arizona undertook a massive consolidation of polling places. The result of this consolidation is that for many habitual voters, the polling place they had previously visited was suddenly no longer their polling place. By comparing the voting behavior of individuals whose polling places changed to those who retained the same assigned polling place over this period, we can make some reasonable inferences about the effect of changing polling locations on the likelihood voters will be confused enough to cast an “out of precinct” ballot.

To construct the necessary dataset, I use GIS boundary files for the 2008-2010 precincts that were provided by the Arizona Democratic Party, superimposing them on the x-y coordinates for each voter in the 2013 Maricopa County voter file. I have also geo-coded the coordinates of the 2010 polling places and linked them to their associated precincts, allowing me to assign each individual to a 2010 polling place, and examine whether the polling place changed from 2010 to 2012. About 40

percent of those registered to vote at the time of the 2012 election were assigned to a different polling place in 2010.

I then simply calculate the rate at which voters cast out-of-precinct ballots in the 2012 presidential election, comparing the rate for those whose polling place has changed with the rate for those whose polling place has not changed. The rate of out-of-precinct voting was 40 percent higher for voters that had experienced a change in polling place. In a precinct consolidation carried out without political considerations in mind, there is no good reason to expect systematic differences—say in income or political sophistication—between those voters whose precinct moved and those living a few blocks away whose precinct stayed the same. Yet those whose polling places changed exhibited a higher rate of out-of-precinct voting, suggesting that the move added to the confusion that appears to drive out-of-precinct voting.

Additional analyses also rule out the possibility that this result is driven by these consolidations somehow affecting people in precincts that happen to have confusing precinct locations. Using a linear regression model with fixed effects for 2012 precincts, I can show that even for people in the same 2012 precinct, those whose polling place changed from 2010 to 2012 were more likely to cast an incorrect ballot. And as with the simpler descriptive approach, the impact of a changing polling place location is substantively and statistically significant.

Turnout was also lower by 1.6 percentage points among those whose polling locations had changed. While turnout since 2008 increased for both groups, the turnout gain was significantly smaller for the group that had experienced a change

in polling place. This finding is consistent with recent academic literature on the impact of precinct consolidation on turnout.²⁹

Not only did many voters in the 2012 general election face a change in polling places from November 2010 to November 2012, but many also faced a more proximate change: from the precincts used on February 28, 2012 for the PPE. Unlike the 2016 PPE, voters were required to visit a specific polling place in February of 2012. However, there were only 212 polling places rather than the 724 that would be used in the primary election in August and the general election in November, or the 1143 that had been used in 2010.

Unfortunately I do not have boundaries of temporary precinct clusters or other data that indicate the assigned polling places of precincts or household addresses in the 2012 presidential preference election. It appears that most voters had an assigned polling place that was only valid for a single Election Day. However, in order to get some sense of the confusion caused by this arrangement, I have been able to ascertain which of the 724 polling places used in November 2012 were also in use in February 2012. Making the safe assumption that voters assigned to these specific polling locations in November were also assigned to them in February, I hypothesize that search costs in November were significantly lower, and hence out-of-precinct ballots less likely, for those whose precincts were stable from February to November.

Indeed this is the case. The rate of out-of-precinct voting in the November election was 30 percent lower for those who did not experience a polling-place

²⁹ Brady and McNulty (2011), McNulty, Dowling, and Ariotti (2009), op cit.

change since February. This difference is statistically significant, and remains so even in a multiple regression that controls for the stability of the polling place since 2010.

Race and ethnicity

The shifting geography of polling places in Maricopa County clearly has an impact on both turnout and out-of-precinct balloting. Let us now examine whether this impact varies across racial and ethnic groups. Earlier in this report, I showed that out-of-precinct voting is, in general, far more common among minorities than among non-Hispanic whites. Now that we have a better understanding of the roots of the problem in election administration, we can gain insight into the sources of the racial asymmetry.

First, it is useful to examine the racial and ethnic incidence of “true” out-of-precinct votes vis-à-vis those that were evidently misclassified as such. Minorities are over-represented in both groups, but more so in the “true” out-of-precinct group. If we calculate the rate of “misclassified” out-of-precinct voters for each group by dividing the “misclassified” out-of-precinct voters by total in-person ballots cast by the group in 2012, we see that the rate is 80 percent higher for Hispanics than for whites. It is 34 percent higher for African Americans than whites, and 26 percent higher for Native Americans than for whites. However, if we focus only on the “true” out-of-precinct votes, the rate is 131 percent higher for Hispanics, 74 percent higher for African Americans, and 39 percent higher for Native Americans.

Next, there are racial and ethnic differences in the geography of polling places. Hispanics live a bit further from their assigned polling places than do whites, and Native Americans live a good deal further. Yet Hispanics also find themselves in more confusing polling place environments than do other groups. That is, there are more competing polling places within a one-mile radius.³⁰

Finally, the impact of shifting polling places on out-of-precinct voting displays an interesting racial asymmetry. First of all, African Americans were more likely to have their polling places moved in the 2012 consolidation than other groups.³¹ Second, these moves had a larger impact on out-of-precinct voting among minorities than among whites. In fact, it turns out that the overall relationship described above—where a change in polling place location is associated with a higher probability of voting “out-of-precinct”—is driven disproportionately by Hispanics and African Americans. One can estimate either separate models for each group, or an interactive specification that produces separate estimates for each group in the same model. Either way, one sees that the estimated impact of precinct consolidation, while statistically significant for all groups, is more than twice as large for Hispanics and African Americans as for non-Hispanic whites.

We see something similar with the change in polling places from February to November 2012. First, the rates at which African Americans and Hispanics

³⁰ These results were obtained by regressing the distance to each registered voter’s assigned 2012 polling place on black probability, Native American probability, Asian probability, and Hispanic probability. Next, I regress the number of polling places within a one-mile buffer on the same variables. A similar result can be obtained using the number of polling places within a two- or three-mile buffer. Moreover, similar results are obtained if the race probabilities are replaced with simple indicator variables that assign each individual a single race—the racial probability that is highest for the individual.

³¹ 42.2 percent of African Americans and 39.5 percent of whites experienced a polling place change. This difference is statistically significant.

experienced stability in their polling places were each about 30 percent lower than the rate for whites. Moreover, as with the consolidation of precincts from 2010 to 2012, the impact of the confusion generated by the PPE was disproportionately felt by minorities. In the regression model described above, the impact of polling place instability on the likelihood of casting an out-of-precinct ballot is more than twice as large for African Americans and Hispanics.

Given many of the facts laid out earlier in the report, this is not surprising. Relative to higher-income home-owners with automobiles, for poor people with unstable rental arrangements, employment, transportation, and child-care situations, even a similar shock to the cost of voting can have a much larger impact.

VI. THE 2016 PRESIDENTIAL PREFERENCE ELECTION IN MARICOPA COUNTY

On top of the perennial problem with confusing and shifting precinct boundaries and polling place locations in Maricopa County, the 2016 PPE added a new wrinkle. Although their votes would typically be invalidated if cast outside their precinct, a few weeks before the election, Maricopa voters were alerted to the fact that on this occasion, the vast majority would be *required* to vote outside their precinct. Election administrators temporarily turned 60 polling places into “vote centers.” Thus for the vast majority of registered voters in Maricopa County, a visit to the polling location assigned to their precinct would have been fruitless because it was closed.

I have obtained the latitude and longitude of the residential address of every registered voter in the 2016 Maricopa County voter file, as well as those of the specific polling place assigned to each voter according to his or her precinct in the

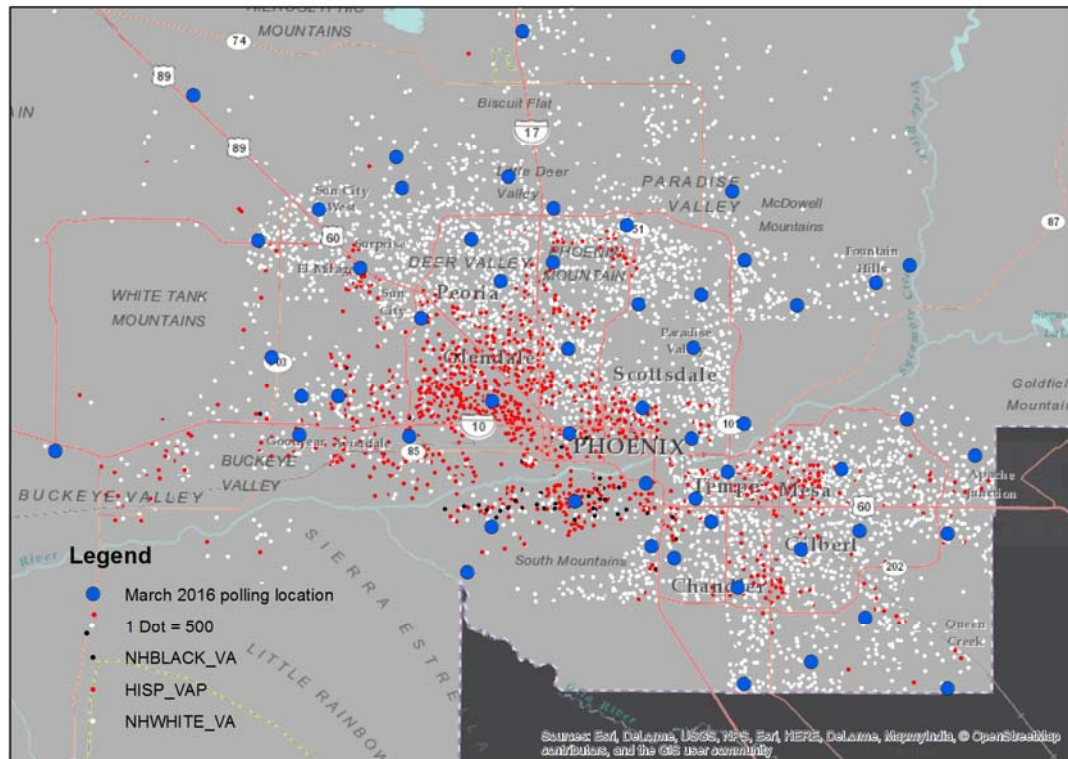
2014 mid-term election. I calculate the distance between each voter and his or her “typical” polling place (i.e., the 2014 mid-term polling place). The median Maricopa voter lives .75 mile from their usual polling place. Next, I calculate the distance between each voter and the nearest of the 60 vote centers to his or her residential address. The median registered voter in Maricopa lived over two miles from one of the vote centers, and the 75th percentile had to travel a distance of around 3 miles.

The costs of learning about the change, finding a new and unfamiliar polling place, and arranging transportation were substantial, even though most of the media attention has focused, quite understandably, on the lines stretching for hours and the lack of parking. It is possible to use geographic information to examine the magnitude of the costs for different groups of searching for and arranging transportation to a new polling place.

In the map below, the blue dots correspond to the polling locations, and as above, the small dots use census data to represent 500 voting-age residents, with black, non-Hispanic white, and Hispanic populations represented with black, white, and red dots respectively.

It is apparent that the heavily Hispanic sections of Western Phoenix and Glendale were under-served by polling places relative to the rest of the metro area, especially considering their population density. The same appears to be true of the Hispanic section of Mesa.

Figure 19: Race, ethnicity, and polling place location in the presidential preference primary, 2016



Visual inspection of a map can be deceiving, however, so it is useful to take a closer look at the data. Specifically, I begin by quantifying the “shock” to the cost of voting as the difference between the distance to the voter’s usual assigned polling place and the distance to the closest 2016 polling center. That is, for someone whose usual assigned polling place is 2 miles away, and for whom the most proximate 2016 vote center is 3 miles away, the difference is one mile. As described earlier, I have used the surname and residential location of each registered voter to assign a

specific probability of being Hispanic, non-Hispanic white, and African American to each.

I use these individual-level racial/ethnic data in conjunction with the distances described above to calculate the share of the population from each group that has experienced an increase in travel distance of less than one mile, between one and two miles, between two and three miles, and more than three miles. Note that given what we know from the prevailing academic literature, a move of more than two miles is quite large, and likely to have a substantial impact on voter participation. In their study, McNulty, Dowling, and Ariotti (2009) estimated that a two-mile polling place move was associated with a very substantial drop of 5 percentage points in turnout.³²

Table 2: Estimated change in travel distance associated with reduction in polling locations in 2016 presidential preference primary, Maricopa County

Minimum added travel distance	Non-Hispanic Whites	Hispanics	African Americans
Less than 1 mile	0.47	0.40	0.45
1 to 2 miles	0.30	0.29	0.29
2 to 3 miles	0.19	0.27	0.22
More than 3 miles	0.03	0.03	0.03

Table 2 demonstrates that the increase in travel distance was significantly higher for minorities than for non-Hispanic whites. For instance, adding up the last two lines in the table, we see that while 22 percent of non-Hispanic whites experienced an increase of more than 2 miles, this was true for 25 percent of African Americans and 30 percent of Hispanics. Looking at the top line, we see that whites

³² McNulty, Dowling, and Ariotti (2009), op cit., Figure 3.

were significantly more likely than others to experience a minimal increase in travel distance (less than one mile).³³

Even these statistics understate the disproportionate impact of polling place consolidation, however. The reason is that “distance” here is calculated as the straight-line distance between individuals and their polling place (the so-called Euclidean distance, or the distance “as the crow flies”). But measuring distances in this manner not only understates the actual distance between points voters must travel along roads, but also fails to take into account the fact different socio-economic groups rely on different modes of transportation to cover these distances.

In particular, according to the most recent data available, the 2005 American Community Survey reveals that 4.7 percent of non-Hispanic white households, 9.1 percent of Hispanic households, and 13.8 percent of African-American households do not have access to an automobile.³⁴

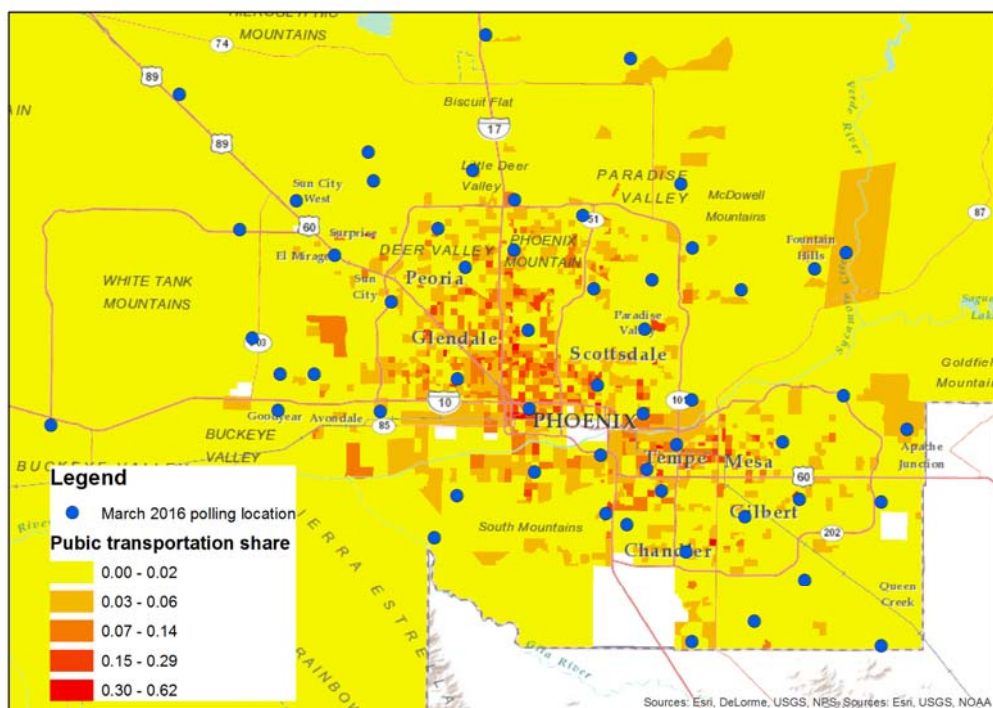
Figure 20, below, colors the census block groups of Maricopa County according to the extent to which individuals report relying on public transportation rather than an automobile in the 2010 census. It demonstrates that unfortunately, the removal of polling places may have been especially difficult for the parts of metro Phoenix where voters do not have access to automobiles. This made voting access especially difficult for minorities, who are far less likely than whites to have access to an automobile, requiring longer travel times to cover the same distances.

³³ Another approach is to estimate an ordinary-least-squares regression to test whether the travel distance to the closest 2016 polling place is higher for blacks and Hispanics than for whites. This approach reveals that the difference is indeed highly statistically significant.

³⁴ Accessed via National Historical GIS, nhgis.org

For first-hand descriptions of this problem, see the declarations of Senator Martín Quezada and Vice-Mayor Kate Gallego filed in this case.

Figure 20: Public transportation use and polling place locations in the 2016 presidential preference primary



Again, it is useful to move beyond visual inspection of maps. I use the coordinates for each registered voter's residential address to place him or her in a census block group, and then query Google transportation data in order to obtain the estimated travel time, in minutes, to the nearest polling place via driving, public transportation, and walking, for each individual according to her block group of

residence.³⁵ For each individual, I consider two estimated travel times—the driving time, and the smaller of the transit and walking estimates. Given the state of public transportation in Maricopa County, walking is often the faster of the two.

I calculate an estimated travel time for each individual according to the prevalence of automobile ownership for her racial/ethnic group. For someone whose Hispanic probability is 1, for instance, the travel time is the driving time multiplied by .909 (the Hispanic probability of auto access) plus the fastest non-auto travel time multiplied by .091 (the Hispanic probability of not having access to a car). Each registered voter has been given an estimated travel time in this manner according to his or her race/ethnicity.

**Table 3: Estimated travel time to nearest polling location, 2016
presidential preference primary, Maricopa County**

Estimated travel distance:	Non-Hispanic Whites	Hispanics	African Americans
Under 5 minutes	0.11	0.07	0.08
Between 5 and 10 minutes	0.52	0.46	0.48
Between 10 and 15 minutes	0.28	0.39	0.37
Over 15 minutes	0.09	0.07	0.07

The data are presented in Table 3. Whites are more likely than blacks or Hispanics to be less than five minutes from a polling place, and most notably, summing over the last two lines, blacks and Hispanics are far more likely to face

³⁵ I use block group centroids rather than estimating travel times for each individual because of constraints on the number of queries that can realistically be submitted to Google. The differences in travel times between individuals in the same block group, however, should be quite small and have no bearing on the inferences drawn here.

travel times above 10 minutes. While 44 percent of African Americans and 46 percent of Hispanics are estimated to face travel times above 10 minutes, the same is true for only 37 percent of whites. These differences are highly statistically significant.

Finally, it is useful to ask a simpler question about the polling places used as “vote centers” in the 2016 PPE. Which voters were able to experience continuity in their polling location going back to the 2014 general election? Given that the same precinct structure will be used in the November 2016 general election as in the 2014 general election, these voters are very likely to have the same assigned polling place once again in November 2016. Recall that in Section Five above, I examined the 2012 general election and found that voters whose November polling place had been used in the February PPE were significantly less likely to cast invalid “out-of-precinct” ballots in November. These voters were disproportionately white in 2012. The same is true in 2016. The share of whites whose November 2014 polling place was used in the 2016 PPE was 18 percent higher than the rate for Hispanics, and 15 percent higher than the rate for African Americans.

VII. LOOKING AHEAD

Although undoubtedly burdensome for a large number of voters throughout Maricopa County, the travel and search costs associated with the sudden change in the location of polling places were larger for minorities than for whites in the 2016PPE. Even if those costs were similar, however, there are a variety of ways in which what appears to be an identical shock to the cost of voting can have a larger impact for individuals that lack automobile access, time away from work, or child

care access. In Arizona, as in many other parts of the United States, these groups are disproportionately composed of minorities.

This report has described a set of confusing and often-shifting polling locations and rules, in addition to what appears to be an administrative error that disenfranchises people for reasons that are not entirely clear. In the context of a highly mobile, increasingly urban population, the practice of disenfranchising would-be voters for choosing the wrong side of the street, or getting into the wrong line at the local church, or perhaps simply changing their registration address, has turned Arizona into the national leader in uncounted provisional ballots.

These practices have had a disproportionate impact on minorities. Disenfranchised out-of-precinct voters—both those who truly attempted to cast their ballots in the wrong precinct and those who were misclassified as having done so—are disproportionately African American, Hispanic, and Native American. This report has shown that when polling places have been moved in the past, the impact on out-of-precinct ballots in subsequent elections was discernable for all racial groups, but was especially large for minorities.

An important concern is that if the past is any guide to the future, the high-profile confusion and consternation associated with the March 2016 PPE will have an impact on out-of-precinct ballots and perhaps turnout in November, especially for minorities. This would be an unfortunate development in a state that already has very low levels of electoral participation among its citizen population, especially among minorities.

Appendix A**"Out-of-Precinct" Invalid Ballots Cast by Maricopa County Precinct, November 2012 General Election**

Precinct Number	Total "out-of-precinct" ballots cast	"Out-of precinct" ballots cast in a precinct that does not match the voter's registration precinct	"Out-of precinct" ballots cast in a precinct that matches the voter's registration
1	15	6	9
2	7	4	3
3	11	8	3
4	13	9	4
5	4	3	1
7	8	5	3
9	7	7	0
10	10	8	2
11	7	3	4
13	1	1	0
15	10	7	3
16	9	1	8
17	11	5	6
18	17	6	11
19	9	2	7
20	1	1	0
21	5	3	2
22	6	4	2
23	11	7	4
24	1	0	1
25	2	2	0
26	17	15	2
27	28	21	7
28	2	2	0
29	19	5	14
30	3	3	0
31	1	1	0
32	14	9	5
33	2	1	1

34	51	45	6
35	18	14	4
36	7	6	1
37	11	4	7
38	57	39	18
39	9	5	4
40	1	0	1
41	24	11	13
42	13	6	7
43	14	9	5
44	12	7	5
45	12	10	2
46	9	3	6
47	6	2	4
48	9	7	2
49	26	20	6
50	3	2	1
51	11	6	5
52	3	1	2
54	21	20	1
55	7	6	1
57	6	4	2
58	1	1	0
59	1	0	1
60	23	12	11
61	36	29	7
62	21	17	4
63	39	18	21
64	1	0	1
65	11	8	3
66	2	2	0
67	12	8	4
68	23	17	6
69	6	5	1
70	13	6	7
71	5	3	2
73	4	4	0
74	5	1	4
75	3	1	2
76	3	1	2
77	5	2	3

79	4	1	3
80	12	9	3
82	2	0	2
83	5	3	2
84	12	5	7
85	10	5	5
87	16	9	7
88	3	2	1
89	4	3	1
90	11	8	3
91	29	16	13
92	15	6	9
93	11	4	7
94	3	1	2
95	5	4	1
96	10	7	3
97	8	6	2
98	38	36	2
100	10	9	1
101	4	3	1
102	8	4	4
103	29	22	7
104	5	5	0
105	8	2	6
106	10	6	4
107	7	2	5
108	6	3	3
109	11	10	1
110	10	7	3
112	2	0	2
113	14	8	6
114	6	3	3
115	8	4	4
116	14	10	4
117	14	10	4
118	7	3	4
119	28	23	5
121	8	5	3
122	19	15	4
123	6	2	4
124	20	19	1

125	1	1	0
126	2	0	2
127	11	9	2
128	7	4	3
129	5	3	2
130	2	2	0
131	4	3	1
132	9	8	1
133	13	8	5
134	21	15	6
135	3	1	2
136	10	9	1
138	11	3	8
139	6	4	2
140	7	3	4
141	4	1	3
142	4	4	0
143	7	1	6
144	16	14	2
145	1	1	0
146	3	3	0
148	4	1	3
149	11	9	2
151	3	3	0
154	14	5	9
155	15	12	3
156	4	3	1
157	8	6	2
158	6	1	5
159	3	1	2
160	6	5	1
161	8	5	3
162	5	3	2
163	14	11	3
164	19	12	7
165	23	16	7
166	10	9	1
167	5	1	4
168	2	2	0
169	7	2	5
170	23	15	8

171	7	2	5
172	11	2	9
173	78	66	12
174	13	6	7
175	24	16	8
176	18	12	6
177	9	6	3
178	7	2	5
179	6	5	1
180	14	12	2
181	14	11	3
182	59	56	3
183	16	4	12
185	18	15	3
186	5	3	2
187	2	0	2
188	11	7	4
189	19	16	3
190	15	15	0
191	17	11	6
192	1	0	1
193	6	5	1
194	8	4	4
195	10	9	1
196	4	2	2
197	9	6	3
198	31	21	10
199	2	2	0
200	11	8	3
201	2	1	1
202	5	3	2
203	1	1	0
204	11	5	6
205	1	1	0
206	3	2	1
207	8	8	0
208	6	5	1
209	11	7	4
210	23	10	13
211	3	1	2
212	40	39	1

213	3	3	0
214	32	19	13
216	3	3	0
217	8	8	0
218	29	18	11
219	10	8	2
220	22	17	5
221	18	8	10
222	11	6	5
223	2	1	1
224	15	9	6
225	35	24	11
226	2	0	2
227	1	1	0
228	6	3	3
229	16	12	4
230	9	3	6
231	2	1	1
233	6	1	5
234	11	2	9
235	6	2	4
236	9	5	4
237	3	3	0
238	34	25	9
239	20	6	14
240	5	2	3
242	16	12	4
243	2	1	1
244	9	5	4
245	2	0	2
246	21	8	13
247	12	6	6
248	11	4	7
249	9	9	0
250	12	8	4
251	15	7	8
252	5	5	0
253	3	1	2
254	1	0	1
255	5	4	1
256	5	3	2

257	11	3	8
258	9	7	2
260	9	9	0
261	23	19	4
262	6	5	1
263	8	5	3
264	4	3	1
265	18	14	4
266	6	4	2
267	11	6	5
268	27	17	10
269	9	6	3
271	13	6	7
272	7	4	3
273	28	16	12
274	23	20	3
275	15	13	2
276	4	4	0
277	7	4	3
278	21	14	7
279	6	1	5
280	1	1	0
281	3	1	2
282	2	1	1
283	6	1	5
284	28	19	9
285	3	3	0
286	9	8	1
287	28	21	7
288	24	20	4
289	4	1	3
291	16	7	9
292	9	6	3
293	9	7	2
294	4	2	2
295	1	0	1
296	13	7	6
297	22	16	6
298	10	7	3
299	2	2	0
300	33	28	5

301	19	10	9
302	56	53	3
303	4	1	3
304	4	3	1
305	2	1	1
306	68	65	3
307	2	2	0
308	21	5	16
309	18	14	4
310	4	2	2
311	3	0	3
312	40	24	16
313	26	17	9
314	9	5	4
315	44	35	9
316	6	2	4
317	1	1	0
318	14	8	6
319	13	7	6
320	8	5	3
322	12	9	3
323	16	9	7
324	7	5	2
325	7	6	1
326	6	2	4
327	10	2	8
328	9	3	6
329	31	21	10
330	12	8	4
331	8	5	3
332	17	11	6
333	21	14	7
334	4	4	0
335	12	11	1
336	11	7	4
337	22	9	13
338	2	2	0
339	31	18	13
340	11	8	3
341	17	13	4
342	1	0	1

343	5	3	2
344	3	3	0
345	29	20	9
346	4	1	3
347	14	5	9
348	10	7	3
349	17	9	8
350	28	16	12
351	14	12	2
352	51	40	11
353	12	6	6
354	1	0	1
356	24	19	5
357	27	18	9
359	40	26	14
360	6	2	4
361	14	7	7
362	22	16	6
363	22	14	8
364	1	0	1
366	8	5	3
367	15	14	1
368	6	4	2
369	7	1	6
371	5	0	5
372	9	4	5
373	13	3	10
374	31	25	6
375	15	6	9
376	4	3	1
377	6	5	1
378	5	3	2
380	14	9	5
381	3	2	1
382	19	14	5
383	30	14	16
384	12	4	8
385	23	11	12
386	2	2	0
387	2	2	0
388	10	8	2

389	13	11	2
390	12	2	10
391	16	7	9
392	8	5	3
393	8	4	4
394	6	6	0
395	3	3	0
396	9	6	3
397	25	20	5
398	36	28	8
399	15	11	4
400	17	10	7
401	1	1	0
402	5	2	3
403	4	4	0
404	7	7	0
405	15	5	10
406	10	8	2
407	9	8	1
408	3	3	0
409	21	16	5
410	22	9	13
411	3	3	0
412	1	1	0
413	3	2	1
414	26	15	11
415	16	9	7
416	13	8	5
418	6	4	2
419	30	18	12
420	1	1	0
421	42	36	6
422	18	14	4
423	18	11	7
424	8	4	4
425	7	5	2
426	4	2	2
427	2	2	0
428	3	1	2
429	10	8	2
430	8	8	0

431	14	10	4
432	13	10	3
433	6	3	3
434	9	3	6
435	10	9	1
436	18	16	2
437	13	10	3
438	16	8	8
439	1	1	0
440	5	3	2
441	7	7	0
442	16	10	6
443	1	0	1
444	6	2	4
445	5	5	0
446	11	9	2
447	1	1	0
448	6	5	1
449	6	6	0
450	6	3	3
452	13	8	5
454	8	6	2
455	28	22	6
456	3	1	2
457	14	6	8
458	3	2	1
459	13	10	3
460	8	7	1
461	25	16	9
462	9	2	7
463	11	9	2
464	7	4	3
465	2	2	0
466	7	2	5
467	15	10	5
468	3	3	0
469	10	6	4
470	12	9	3
471	9	8	1
472	12	7	5
473	4	0	4

474	10	5	5
475	3	2	1
476	17	17	0
477	8	7	1
478	1	0	1
479	17	6	11
480	15	13	2
481	4	1	3
482	12	8	4
483	6	2	4
484	4	3	1
485	4	1	3
486	16	13	3
487	11	7	4
488	15	5	10
489	8	7	1
490	6	2	4
491	15	8	7
492	2	1	1
493	12	4	8
494	1	1	0
495	2	2	0
496	12	6	6
497	3	1	2
498	3	2	1
499	9	3	6
500	18	8	10
501	8	4	4
502	11	4	7
503	29	14	15
504	21	13	8
505	14	9	5
506	19	12	7
507	15	10	5
508	7	3	4
509	5	3	2
510	18	10	8
511	26	23	3
512	5	3	2
513	4	2	2
514	9	4	5

515	3	3	0
516	10	8	2
517	11	10	1
518	8	7	1
519	8	5	3
520	4	2	2
521	2	1	1
522	8	4	4
523	17	9	8
524	22	13	9
526	2	2	0
527	7	1	6
528	2	1	1
529	6	4	2
530	4	2	2
531	10	5	5
532	1	1	0
533	31	19	12
534	7	7	0
535	9	4	5
536	5	4	1
537	17	9	8
538	6	5	1
539	6	5	1
540	7	5	2
541	12	8	4
543	9	2	7
544	4	3	1
545	18	13	5
547	9	7	2
548	7	4	3
549	2	1	1
550	22	12	10
551	15	8	7
552	3	1	2
553	4	2	2
554	1	1	0
555	7	6	1
556	2	1	1
557	7	4	3
558	4	2	2

560	14	12	2
561	11	7	4
563	8	4	4
564	1	1	0
565	19	16	3
566	31	23	8
567	7	2	5
568	18	5	13
570	14	11	3
571	34	27	7
573	3	2	1
574	2	1	1
575	2	0	2
576	7	7	0
577	1	1	0
578	1	1	0
579	14	8	6
580	8	7	1
581	11	8	3
582	1	0	1
583	24	14	10
584	10	2	8
585	19	9	10
586	28	16	12
587	6	1	5
589	6	2	4
593	9	4	5
595	15	10	5
596	7	2	5
597	15	8	7
599	7	4	3
600	2	2	0
601	15	9	6
602	13	10	3
603	16	8	8
605	2	2	0
606	12	7	5
607	11	6	5
609	10	6	4
611	15	6	9
612	2	2	0

613	78	48	30
614	1	1	0
615	6	2	4
616	9	8	1
617	5	1	4
618	1	1	0
619	12	9	3
620	2	1	1
621	12	8	4
622	10	2	8
623	1	1	0
624	5	2	3
626	23	11	12
627	8	7	1
628	1	1	0
629	4	4	0
630	31	17	14
631	17	9	8
632	13	5	8
633	13	9	4
634	1	1	0
635	7	4	3
636	10	9	1
637	7	6	1
639	9	9	0
641	30	9	21
642	28	23	5
643	1	0	1
645	3	3	0
647	18	12	6
649	7	6	1
651	20	12	8
652	22	17	5
654	10	4	6
655	4	2	2
656	16	14	2
657	18	13	5
658	21	21	0
659	3	1	2
660	15	13	2
661	1	0	1

662	5	3	2
663	15	10	5
664	4	3	1
665	5	4	1
666	1	1	0
667	9	3	6
668	24	18	6
669	11	3	8
670	8	5	3
671	20	7	13
672	3	3	0
673	7	4	3
674	33	23	10
675	5	3	2
676	19	12	7
678	2	2	0
679	16	8	8
680	2	1	1
681	21	11	10
682	3	2	1
683	10	6	4
684	17	12	5
685	12	7	5
686	5	4	1
687	6	2	4
689	8	3	5
690	21	19	2
691	12	10	2
692	4	3	1
693	8	5	3
694	8	4	4
695	14	13	1
696	8	5	3
697	30	11	19
698	7	6	1
699	5	1	4
701	8	5	3
703	21	21	0
704	4	4	0
705	2	2	0
706	30	23	7

707	24	13	11
708	2	2	0
709	14	12	2
710	9	3	6
711	3	1	2
712	2	0	2
713	8	5	3
714	10	6	4
715	43	38	5
716	3	3	0
717	1	1	0
718	7	3	4
719	12	3	9
720	21	15	6
722	6	2	4
723	6	5	1

Note: Precincts in which no out-of-precinct ballots were reported are not included.

Source: Maricopa County Recorder's Office Information Systems Center: Provisional Ballots Detail Report for Election 1221, Maricopa County, on 11/06/2012. The file designation is BVO2_Detail_Voter_List_Maricopa_2012.pdf.